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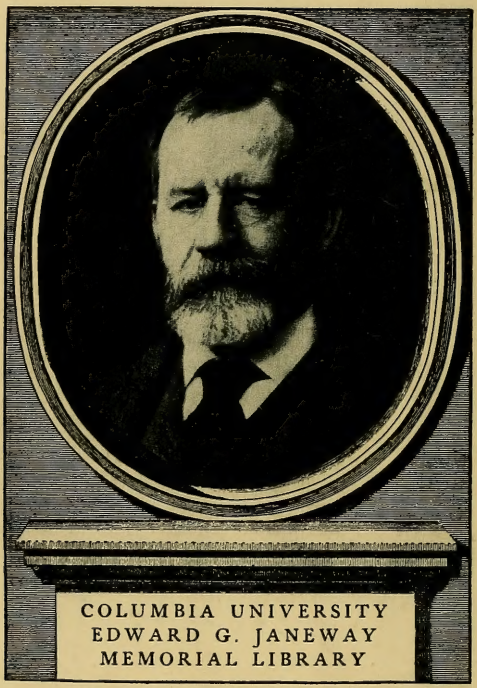

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THE
ENDOCRINES

BY
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PREFACE

Heredity is the most profound factor in life. Environment is an ever present influence. Physiological functions have a well recognized normal basis, and deviations therefrom come under the head of the abnormal or pathological. A continuous struggle against bacteria calls into play the protective and defensive mechanism of the body. In this struggle, as well as in the fight against new growths, not only are the principles of physiological chemistry and bio-chemistry to be considered, but likewise the defense and protection supplied by what are known as the ductless glands. Congenital and hereditary deviations in the functions of the ductless glands, altered inter-relations at different physiological periods, the attacks of bacteria, environment, etc., are productive of many physical, mental and psychic abnormalities. Heredity, the effects of environment, and many of the states of mankind can be properly appreciated only by an understanding of endocrine activity and interrelation.

The development of the tissues and structures of the body, the normal development of the cerebro-spinal system, the proper functioning of the various structures and tissues are all intimately connected with the work of the ductless glands. The function of the all important autonomic nervous system depends much, if not entirely, on a proper balance of the endocrine system. Mental states, psychoses, neuroses, abnormal as well as normal behavior, are all quite as closely related to these important

ductless structures. If we are, in the final analysis, very much the expression of the activities of the endocrines on the autonomic nervous system and on our instincts and emotions, and if our instincts and emotions are deeply related to the endocrines, then *mens sanis in corpore sano* takes on an added significance. The subconscious state is intimately linked with the instincts and emotions. How much closer to the true and wholesome are we led by these facts than by the aberrations of the theories of Freud.

What is known of the endocrine glands is bearing more than sufficient root to form a working basis for the understanding of these numerous hereditary, physical and psychic questions. Only by therapy and by the use of the extracts of these glands can we be led to definite conclusions. Hence, every practicing physician has in his hands the material with which he may lend aid in the research along these lines.

It is in the hopes of putting the basic principles of endocrinology and many of the questions which hold out promise of solution into the hands of interested medical men that this work has been put into print. I have drawn from the works of Cushing, Biedl, Knauer, Falta, Davenport, Guyer, Cannon, McDougall and others, giving credit wherever possible. Many of these authorities were consulted and studied years ago. Much of what was originally viewed with skepticism is now generally accepted as current truth. Whatever of theory is printed in these pages represents an attempt at a solution of vexing problems. It would be idle to claim that there may be no change in some of these theories, but a beginning must be made, and while a beginning is made with hesitation, these opinions are offered on the basis of therapy fortified by clinical observation. If in so many

fields the results of therapy are as favorable as they would seem, this effort too has been worth while. If the factors which suggest the relation of the endocrines, among them adrenal cortex and especially pituitary gland, to fibromyomata prove other than visionary, then the possible solution of the etiology of malignant growths will be hastened.

S. Wyllis Bandler.

134 W. 87th St.,
New York City.

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CONTENTS

PAGE

CHAPTER I

INTRODUCTORY 1

CHAPTER II

ENVIRONMENT AND HEREDITY 4

CHAPTER III

AN INTRODUCTION TO THE STORY OF THE ENDOCRINES 56

CHAPTER IV

INTERNAL SECRETIONS 93

CHAPTER V

THE ENDOCRINES IN GYNECOLOGY 135

CHAPTER VI

HYPERGENITALISM AND HYPOGENITALISM 150

CHAPTER VII

SKIN AFFECTIONS AND THE INTERNAL SECRETIONS 158

CHAPTER VIII

PUBERTY AND CLIMACTERIUM 161

CHAPTER IX

THE "HIGHER UP" THEORY OF STERILITY IN WOMEN AND ITS RELATION TO THE ENDOCRINES 171

CHAPTER X

PREGNANCY, LABOR, AND THE PLACENTAL GLAND 196

CHAPTER XI

CONSTITUTIONAL DYSMENORRHEA 218

CHAPTER XII

INSTINCTS AND EMOTIONS 232

CHAPTER XIII

MENTAL AND NERVOUS DEFECTS 250

PAGE

CHAPTER XIV

Mental Deficiency and Criminality 257

CHAPTER XV

Neuroses and Psychoses 267

CHAPTER XVI

Phobias 271

CHAPTER XVII

The Autonomic Nervous System 280

CHAPTER XVIII

The Balance Between the Endocrines and in Each Individual Endocrine 287

CHAPTER XIX

Therapeutic Suggestions Concerning Endocrines 314

CHAPTER XX

The History and the Symptoms 331

CHAPTER XXI

Clinics 355

CHAPTER XXII

Cases 397

Index 477

THE ENDOCRINES

CHAPTER I

INTRODUCTORY

Medical training may have its faults on the anatomical and laboratory side of its teaching, in that it demands too much time and attention to these points to the exclusion of sufficient information and knowledge concerning the individual, his instincts, his emotions and his psyche. Too many men are imbued with the notion that the laboratory side is the all important and while histology, pathology, physiological chemistry, the various blood, metabolic and other tests are of the greatest importance in adding to our knowledge and in aiding our diagnosis, the intensive study of and devotion to these branches are and must remain within the province of men devoted to that particular type of work; and while the physician must understand the importance of these examinations and tests and must of course be able to interpret their meaning, he should not neglect and must not neglect the study of human nature, of psychology, peculiarities of physical, mental and psychic type, the study of the endocrines, etc., the interpretation of which ought to be given to him by no one but himself when applied to each case in his practice. The old-fashioned, kindly physician we recall from our boyhood days, the country practitioner, brought up in a small community, the man whose childhood and environment brought him into close contact with all sorts of people whose past and present he understood, without knowing at the time that he did understand; the man with the innate power to understand and analyze human beings possesses no mean advantage over the type of physician who is ultra-scientific in the laboratory sense and nothing more. The ideal, of course, is a combination of the two.

Of all men the physician is thrown into closest relations for the study of man and his ills. It is, however, no longer a question of examining the lungs, the heart, the kidneys, taking the blood pressure, examining the blood and then giving his advice; it is no longer a question of combating the various infectious diseases; it is not alone a struggle with the various forms of benign and malignant tumors; it is no longer the practice of surgery with its saving of life and the improvement of health; the physician should be able and must be able to understand the difference between normality and abnormality in the innumerable deviations of body, mind and psyche associated with and due to the ductless glands. They are the underlying factors in heredity; they have to do with growth and development of body and mind; they have to do with instincts and emotions; they have to do with normal and abnormal psychic and mental states; and from these ills come more torture and suffering than anyone but the physician really appreciates.

The differences between animals of various species are due to the ductless glands. The variations between animals of the same species are due to the ductless glands. Race characteristics are produced and perpetuated by the same factors, and the differences among individuals of the same race likewise depend on endocrine activity; and resemblances in body, mind or psyche, whether the resemblance is that of normality or abnormality, are due to like or similar relations in the activity of the endocrines.

The instincts, the emotions, their relation to the endocrines and, therefore, to behavior will be discussed later; a very brief reference to these most important questions is in place. Among the more important instincts and emotions are (1) The instinct of flight and the emotion of fear; (2) The instinct of pugnacity and the emotion of anger, as evidenced by fighting; (3) The instinct of self-assertion and the emotion of elation evidenced by the ego and independence; (4) The instinct of subjection and the emotion of subjection, shown by negative self-feeling; (5) The instinct of suggestibility shown by the

readiness to accept or to be taught; (6) The instinct of contrasuggestion, which is one of the most determining factors in human or animal life; (7) The sex instinct, which is quite different from (8) the maternal and the paternal instincts; (9) The gregarious instinct evidenced by hunting in packs, the desire to be in company, in groups, associated with one's fellows.

CHAPTER II
ENVIRONMENT AND HEREDITY

There has always been the problem of the relative importance of heredity and environment. The laws of heredity are to a great extent known, thanks to the untiring efforts and study of our still unrecognized scientists. And these laws are being continually verified and amplified. The laws of heredity as to instincts and emotions are probably quite the same, but since the instincts and emotions are so capable of change, the study of the same presents a more difficult problem. Environment is not the proper term. It is not only the surroundings and the conditions and their character, it is the training or the treatment a baby, child or adolescent receives. Neither is training the proper word, for it calls to mind the circus with its whips and blows and show of power. The better term is treatment. If people imagine that a beautiful home and elegant interior, comforts and luxuries are the heights of environment and that this is all or the most essential, they satisfy themselves and their consciences only too readily. It is the treatment a child receives and the effect on its instincts and emotions that brings out the good or the bad or represses the good or bad. Intelligent treatment can be as well carried out in modest, wholesome surroundings. Even from the midst of poverty the world sees and has seen rise many, if not most, of its best and marvelous products, because difficulties, obstacles, struggles, work and necessity are related not only to the survival of the fittest, but to the success of the strong and the fighter. The effects of environment are important. Children observe and imitate and, however meagre is the artistic or aesthetic on the walls, on the floor or in the furniture there should be surroundings that do not create a lack of respect for the decencies, amenities and courtesies of life.

The chief idea in treatment and education is to prepare the human being for the work and obligations of life and for parenthood. Children should not be taught that the main pur-

pose of life is pleasure and that a path of roses will always be theirs. They should be taught to expect little and whatever more comes to them is, in the current phrase, "velvet."

Girls should be prepared to take life as a long road. Why should they in their earlier years at home, school, or boarding-school center their thoughts too much on dress, social activities and gaieties? The domestic virtues are the best and these should be inculcated. When thought and activity are centered too much on any one phase, they exclude action in other channels. If occupied with too many phases that oppose each other, we develop the jumpy type of individual looking for and desiring change and excitement; and while the instinct of Wanderlust is strongly inherent in many individuals, faulty treatment may readily develop this instinct into a physical or mental Wanderlust beyond the normal.

When a man and woman marry, are they supposed to train each other, or are they supposed to treat each other according to their respective instincts and emotions and according to the most sacred principles of community of interest? No one has a right to expect of his partner more than that individual is capable of being. Therefore people should first know themselves and should be taught to understand others, for life in any of its relations is a matter of give and take and to most people it seems to be a question of take.

The treatment a person receives to a great extent determines his behavior and this applies not only to individuals but to groups, communities, states and nations.

Several children in the same family may have the same environment and if they receive the same treatment, possessed as they probably are of different instincts and emotions, how can we expect like results? Not only have they inherited different physical qualities and different endocrine relation, but they have been differently affected by the infectious diseases of childhood, react differently to the same stimuli, and wise are the parents who sense these facts and act accordingly. What right have we, who are full of faults and weaknesses,

who in our attitude and relation to others are often petty and ungenerous, to expect in the growing, immature minds those perfections of nature we so fondly desire for them, and what right have we to blame, criticize and condemn the very qualities, weaknesses and faults which we ourselves in all probability have passed on to them?

Earliest Impressions

A baby cries when brought into the world in contact with the air, or it is made to cry by slapping it. This reaction to external stimuli resulting in a cry is really the emotion of anger. The newly-born child has the sensation of hunger as perhaps the most noticeable urge. All infants are sensitive to pain, and to the sense of the pleasurable. Even in its earliest days it may coo with all the notes of pleasure and contentment. In the earliest weeks it fixes its gaze on the face of the nurse and receives its first retinal impressions. These soon form an outline. The soft and the rough become differentiated, and repetitions of voice and the sight of the face prompt the evidences of recognition. Perhaps the voice rouses the first manifestation of recognition, although the really first habit is connected with suckling. Hearing, the sense of smell, the sense of taste, are continually recording the effect of stimuli and creating paths of experience. The skin, the bath, the powdering, the clothing, irritations, an occasional pin point, the instillations and washings of the eyes are creating new paths. Gradually the ego develops and soon the child begins to assert what amounts to a "yes" or a "no." The emotions of pleasure and anger are aroused extremely early, and fear is among the first of the arousable emotions. Soon the baby crawls, learns to balance itself, to stand, and eventually to walk.

Training as to the habits associated with physical functions may yield really wonderful results at a very early period, though physical states may thwart these attempts,—especially as regards nocturnal enuresis. Discipline, acting on the instincts and emotions may influence the infant according to the elements of subjection, self-assertion, suggestibility, fear,

wonder, curiosity, and so on through the whole line of the simpler and more complicated or plural combinations.

A child of three years has its instincts and emotions well in evidence; its memory is excellent, it remembers what you promised to bring, asks questions, wants explanations,—and is in most ways a miniature adult. But the recall of this period of its existence is lacking in later life because of the immaturity of the cells receiving the impression. Yet the mechanism of each reaction to stimuli on the part of the instincts or emotions becomes established and sensitized so that fear of one or more sorts may persist as a tendency and be easily roused after one or two, or many repetitions of the original stimulus, even though later the recall of the original stimulus does not exist. But there comes a time after which the recall of incidents, events, and impressions is developed, and though a child may remember one fearsome or pleasurable event as its first recallable one, the same or a parallel impression associated with an emotion of fear may have been made dozens or a hundred times before. Therefore the effect of fear in these earlier unremembered years may be carried on through the remainder of life, even though, as just stated, the first recall may date from a later period. One may remember a book he has read long ago and may express his opinion of it. The impression has been made and the reader may consider it one of the most instructive books he has read, yet he may not connectedly recount the story or remember the names of more than a few of the characters until they are brought to mind by some one else, or by a rereading.

The earliest experiences of a child are the most important because paths are made by stimuli. These paths follow a course involving the psychic, physical, and nerve mechanism, with an associated endocrine reaction. Each path has been created by a peristaltic wave, so to speak. Such paths are naturally the most sensitive since they are the earliest, and the obliteration of the once well established psycho-physical neuro-endocrine path is impossible. The sensitiveness of this may be dimin-

ished or overshadowed, or no longer brought into play, but what was once created as a path or groove may still exist. With any such path there may be associated grooves or paths or inlets through allied senses, so that an impression made by any experience may be transmitted by sight, through the skin, the sense of smell, taste, or hearing, or later by thought. Several parallel grooves may be created as the consequence of a stimulus, such as an event or an experience. With each groove that is created there has been and is a connection through nerve paths with an endocrine activity,—so that not only with the great and powerful emotions but with innumerable of the minor ones, and with the innumerable processes not viewed as emotions, there is not only a psychic and a neural path but an associated endocrine process.

If this be true, we might imagine every impression from the earliest to the latest, though they number millions and billions, to have created a path from without inward; and associated with these paths were all possible degrees of emotions up to the degree evidenced by the facial, physical, and functional responses. Therefore the reverse of this would be an antiperistalic wave, where by endocrine activity of any sort, produced by digestive, metabolic or other natural systemic causes, might reproduce the emotion and the psychic and mental phases of the original impression. This might account for phobias and fears which persist, for inexplicable feelings of danger and impending events, troubles or disasters,—and for dreams and their associated emotions, whether pleasurable or fearful, co-ordinate, fantastic, and chaotic, sexual, or otherwise.

One should take into consideration the factors of heredity in considering the questions of instincts, emotions, disposition and character and their relation to the endocrine system and the psyche. It is of the utmost importance to realize the effect of stimuli, pleasant or otherwise, on the emotions, the mental state, and the associated endocrine reaction; for it is as certain that psychic shocks are injurious as it is that inflammations produce,—for instance,—a thyroiditis after in-

fluenza. A child is born with instincts, emotions and endocrines of a type contributed by its parents and inherited from them and their ancestors. Its emotional experiences are evidence of, and are associated with, endocrine activity. The type of mentality and mental development are evidences of normal function, hypofunction, or excessive function,—for instance, of the thyroid and pituitary. Its preference for certain forms of play evidences not only its psychic and instinctive makeup, but often its physical adaptability. This is, of course, susceptible to modification through education.

Some children have a remarkable sense of balance; others have this function to a lesser degree, and are therefore more timid in activities requiring its function. The experiences in the aviation service show that only those with a well-developed sense of balance are qualified for flying. This qualification rests on a physical basis, having to do with the well-recognized cerebellar mechanism. Many adults cannot look down from a great height or follow a dangerous trail without recoiling, this lack of balance resulting in a sensation of apprehension. Thus their apparent fears rests solely on a defective *physical* mechanism.

Of all the emotions which are injurious, fear stands at the head. Its effects in children are most pronounced, and if any fear becomes fixed it may have a lasting effect throughout life. The instinct of flight, associated with the emotion of fear, has inlets through the various senses; many of these inlets or paths are performed, but may be blocked, shifted or modeled into a more pleasurable or less fearful emotion by experience, or through explanation, or by play.

We must recognize the relation of physical states and instincts to fears. The development of inhibition or of switching may be exemplified as follows:

A little boy two years old was taken to Van Cortlandt Park during a field day and was held in his father's arms on the summit of a hill overlooking the parade grounds. A field gun boomed with its noise, its flame, and its smoke. The

little child clung to his father and said: "I want to go home." The father replied: "All right, but let's hear just one more of those lovely sounds and watch that beautiful smoke." At the next report, the father said: "Isn't that lovely? Let's watch another,"—and he jumped up and down, repeating the words, "lovely, fine, beautiful,"—and soon the child also jumped up and down, repeating these words, watched the whole performance, and was taken home with fear changed to an emotion of pleasure by the shunting or shifting process which interposed a switch between the stimulus given through the eye and ear and the first instinctive reaction. The same method was applied to thunder, and the child now regards thunder as the talk of the clouds telling the raindrops to fall. One day this child screamed out with a note of fear in his voice when his older sister, growling like a lion, asked him to hide under his bed-clothes for the sake of play. When asked why he cried out and why he refused to play, he replied that he was afraid to go under the bed-clothes because there might be a lion there. Now, for hours he had played with his father, hiding under the bed-clothes, while the indulgent parent pretended to seek him elsewhere, and he would continue this play without let-up on innumerable occasions had his wish been followed. But hearing the growl, with his sister impersonating a lion, meant something different to him. The next day when his father carried him upstairs on his back, he said: "I am going to be a big lion and you are the baby lion; you know lions don't talk as we do, they growl, but they understand each other. Now I am going to growl real loud, and that means 'I love you'; and then you'll growl back, and I'll know you are saying that you love me. Now, when I am going upstairs, if you want me to go faster, growl louder still, and I will know what that means." As a result, the lion play, with the bed-clothes, is a source of pleasure to this three and a half year old boy.

One summer, a five year old child,—a little girl brought up without any element of fear, protected from stories in which death was mentioned, a child to whom no fairy tales were read

because it was seen that she did not like them,—began, several nights in succession, on going to bed, to call repeatedly for her mother or nurse, making requests of all sorts as an excuse to bring them into her presence. She was questioned carefully and finally informed her parents that several little girls with whom she had been playing recently, for the first time, had spoken about kidnappers and kidnapping and had been warned by their paernts not to go out of the park in which they lived. Here was the explanation of the fear of this five year old child, one who at the age of nine enjoys reading but does not care for Grimm's fairy tales. Every call of that child was responded to, and the light was left burning in her room or in the hall; and with the simple explanation that the story of the kidnappers was an old tale of the long ago and had nothing to do with modern days, she now sleeps without a light, goes into the bathroom at any hour of the night, and presses the electric button without calling any one.

It should be generally recognized that fear tends to become fixed in a child's consciousness and thus readily becomes a permanent impression. In adult life, the physician sees these fears or phobias in varying degrees, up to obsessions. In adult life experience, shocks,—such as frights, worries, disappointments, financial upsets, loss of a dear one, etc.,—may cause psychic injuries which produce lasting harm.

With a child, the infectious diseases may produce a temporary or lasting effect on any one or more of the glands in the endocrine chain and thereafter fear may be more readily aroused. At puberty, when the ovarian function is established, the ovary,—the interstitial portion of which has been active up to this time,—evidences the entrance of the glandular portion into more or less rhythmical play; so to speak, a new endocrine has been introduced into the circle of endocrines engaged in the development of body and mind and associated with the play of the instincts, the emotions, and the psyche. One of the normal sex functions has appeared, and from this time on it must be expected that its action and the action of the associated glands and their inter-relation are continually more

and more centered on the preservation of the sex organs, and this aside from any consciousness of this function or aside from any interpretations or views which the child may acquire. This altered glandular activity must of necessity exert a differing trophic stimulus upon the brain and the vegetative nervous system, with a consequently to-be-expected possible variation both on the instincts, the emotions, and the psyche.

And the reverse of this action is also to be expected. At any period such as this, the life of the individual, his books, plays, teachers, associates, and parents may markedly,—especially in the more sensitive,—rouse, stimulate, or inhibit the various emotions in innumerable ways and degrees. During this period, as well as later, any of the infections or the infectious diseases may play an important part, especially upon the endocrines; and this period of adolescence is the critical period during which the psychoses,—especially dementia praecox,—manifest themselves.

Influenza undoubtedly exerts its play upon the endocrines, and I have held and still hold that the mental changes resulting therefrom, which are of course evidenced to us by the psychic alterations, are not only toxic in character but in all probability are the result of injuries produced in the various endocrines, resulting in plus, or minus or dys.

Happiness or the pursuit of happiness is the factor of greatest interest in our existence. The real purpose for each and every one of us is to carry on the physical existence of our ancestors. In our children, fear and worry are the greatest deterrents to happiness. No one can fully appreciate the horrible and lasting effects of fear unless he thoroughly reviews the events of his own life; for everyone knows that experience is the best teacher. We should try to make of every parent the psychologist who can teach himself more by a review of his or her life than can be learned from all the books that were ever written, even though they are and should be the greatest aid to teaching. And here let me say that if books, plays, biographies, the cinema, history, etc., were used to explain psychology, and if they were properly interpreted, then

their lessons would be considered the essential points rather than the passing interest or diversion which they create, however wholesome these may be. Here follows an experience of a friend of mine:

"When I was a boy we had a cook called Katrina. She was most devoted to six children in her care and attention; and her subsequent married life and the career of her children has been a matter of interest to all of us. But Katy in her desire to stop the nightly pillow-fights and the conversation indulged in after we were tucked in bed, informed us repeatedly of the dragons and little dwarfs which she would call to her aid to punish us for our disobedience, and many is the night that I have lain with my face to the wall unable to turn around because Katy's goblins were standing there with hatpins and sharp-pointed instruments biding their time till it suited them to do their nefarious work. My childhood dreams were along lines of fear. Only one who has gone through such experiences can appreciate the possibility of the play of fears on the child's mind and of all this and with all her care and devotion, *my mother knew nothing about it.*

"Yet very early in my life my mother spoke to all her children concerning what she termed self-abuse. She warned us of the various things we might see or be told, of the false impressions that might be created, and informed us that it was totally within our power to be perfectly clean and sweet and that in every way we would be the better in guarding ourselves. She said that four-footed animals had their heads so placed that they looked to the ground, for that was the source from which they obtained their food. God had put man on two legs so that he could look forward or backward mostly forward, but that the main purpose was to enable him to hold his head high and to look upward where dwelt the Almighty who created and governed the world. She said that for this reason we should not look downward, so far as our persons were concerned, nor should our thoughts or actions turn in that direction."

"I remember when at high school, the principal walking

down the aisle toward me one day and saying to me and to my brother who sat at the next desk, 'How is it that you boys never sit with your legs crossed, never keep your hands in your pockets, and never touch or play with yourselves?' And I remember his look of astonishment when I answered, 'Why, mother told us all about it long, long ago.' He walked to his desk, called the schoolroom of boys to order and spoke on this question for several minutes."

Now this shows a certain path of obligation on the part of parents or teachers, for we recognize the fact that the first impression is the most marked and lasting, and subsequent erroneous, false or abnormal statements or teachings as they come from playmates of their own age or from older children then have to battle with what has been instilled in a normal, wholesome fashion.

Early Habits

I presume that one who remembers his boyhood days and his school companions knows the hazy, indefinite and peculiar notions which are circulated concerning the sex organs,—receiving from some minds close attention and imitation and from other minds, especially if they have been well trained and warned at home, receiving no consideration whatever. Without experience of this sort, I think the average individual grows up with a rather indefinite notion of what these practices are, how commonly they are followed and how they are spread.

We hear much of the bad effects and the evil meaning of thumb-sucking in children. It is an extremely interesting observation that almost immediately after birth the average baby gives true sucking motion with its lips, and very promptly the fingers enter its mouth. Hunger is satisfied by the suckling tendency of the child; suckling is one of the earliest actions which the child discloses. At this time at least we can scarcely talk of its being due to sex stimulation. To turn a continuation of this earliest manifestation into evidence of onanism in an

infant, as would the system of Freud, seems quite out of keeping with what appears to be the true state of affairs.

All mucous membranes are sensitive to the pleasurable, and the disagreeable or painful. So are all the senses. Everyone may be rubbed the right or wrong way, everyone has a tender or sore spot. We might as well call a liking for candy and sweets or a fondness for certain foods, because pleasurable, evidences of a sex trend. I would call a craving for sweets a demand exercised by some metabolic condition, with some endocrine urge at the back of it. A craving for alcohol is an excessive urge to satisfy immediately a need which may in a more wholesome manner, though much more slowly, be satisfied in many cases by sweets or other foods.

"Every child is an egoist and a sensualist during a period before clear thought begins and verbal language is used. Every child occupies himself in dealing with a body of sensations, some of which he finds strangely pleasurable and longs to reproduce." (Putnam.) And the same holds true all through life.

If we study the primitive instincts and emotions we note that they are of different and varying degrees of intensity assembled in varying proportions and interrelations just as we might expect from the chromosomes which carry on the other inherited characteristics. If, in addition to these innumerable possible variations in instincts and emotions, we take into consideration the influence of pluriglands and pluriglandular changes, we must necessarily picture to ourselves the existence (as is the case) of a tremendous variety of personalities. Since our instincts, emotions, mental and psychic states are stimulated, inhibited, altered and complicated by endocrine action, we may understand that, by thinking of the endocrines as a stimulus and the emotions and the psychic factors as the end result, the recall or the awakening of any experience may take place without the element of volition, as in dreams, habits, etc.

The neurologist and the alienist are of necessity deeply concerned with psychology. We have the extensive work of

the Freudians which, however, takes no note of the associated and innumerably varied endocrine stimulations and activities in different persons. The principle is that suppression of sex impulses constitute the injurious factors. But why do they result injuriously in some and not in others? It would not be true to say that because we find these changes in certain beings, that others who do not suffer in the same manner may not have had the same total of experiences. If they have had these same experiences why are they free of the symptoms belonging to the Freudian complex? Life from the earliest moment is a series of reactions to stimuli acting through the senses. These reactions are related to instincts and emotions. Action is the result of sensation or irritation or emotion. We cannot suppress an emotion, though we may and all the time do control the impulse prompted by an instinct or emotion. So we are all the time suppressing impulses and desires and thousands of those who do not are to be found in our prisons.

Repression of an act or function associated with or supposed to complete an emotion implies that some endocrine outpouring, instead of being used in the completion of the act and in supplying the stimulus or energy associated with that act, is exerting its action elsewhere and in other channels so that internal combustion is going on instead of an explosion. This, of course, accounts for innumerable variations in internal function, mental action and psychic effect.

And so any bad habit, such as onanism, not only disturbs internal secretory relations, but, if carried too far, dissociates from itself other normal, mental, physical and psychic activities, and removes them from the field of desire and interest. Hence onanism according to the effect it produces, according to the mental and psychic constitution of the individual and according to the interpretation which the individual places on the habit, is for these reasons and along these lines, in some cases possibly harmless, in others harmful and in many cases most injurious.

If during certain psysiological periods of development attention is unconsciously attracted to the sex organs, this may

in a way be considered a natural trend. To permit a child or adult to center continued attention by touch, manipulation and thought in these channels stimulates and rouses the associated emotions, sensations and endocrines and may make that path unusually sensitive. If one is frightened by being told that this habit leads to mental upset and degeneracy, the psychic effect, if the habit be continued, may be very bad. If the habit becomes pronounced, it may and often does have a bad physical and psychic influence leading more readily to other processes and relations, all of which may readily be responsible for neuroses of various sorts.

Unusual fondness or devotion to any pleasure or amusement may lessen the desire for other pleasures or even for one's vocation or duties. I am told that many years ago in England business contracts between partners contained a clause that neither should play golf except on holidays. So it is with habits and processes of mind. Constant repetition brings in associated ideas or suggested by-views which extend the range of the original work, thought or idea. Increased concentration in one thing may result eventually in a dissociation from other spheres, and according to degree may be wholesome or may interfere with the sense of proportion and relation. Hence the value of diversions, avocations and hobbies. Hence continued worry, grief, hatred, animosity, suspicion, regret are concentrations which in addition to the endocrine activities associated therewith, are often carried to the point where the sense of proportion is lost and the diversions of other thoughts and pleasant emotions are totally neglected or rendered impossible. To whatever degree concentration, whether it be pleasurable, serious, scientific or speculative, is carried too far, the mechanism of the psycho-physical nature is put to continued use and to great strain. However much it may be well-borne at first, it lends itself either to the exhaustion of that mechanism or to such high development of it that its activities are abnormal and its reactions oversensitive and exaggerated.

The immediate surroundings in which a boy or girl lives during sexual development all have an influence. The de-

gree and character of the influence exerted from the genitalia depend on the resistance of the nervous system, or on the temperament, hereditary constitution, education, and training.

"Too early entrance into social life, attendance at theatre, and the reading of general literature may have a bad sexual effect. All these, added to the knowledge of development and the establishment of the menstrual function, and the character of the child's associations, determines the degree to which the hazy and indefinite "sexual instinct" follows a normal or excitable course. Psychologic reaction to the "sexual instinct" at puberty evidences itself in many ways, all of which represent the need of expressing objectively the newly developed inner feeling. Religion and poetry are often the fields in which these longings are expressed. Young girls at puberty often give themselves up to enthusiastic admiration and adoration of ideals or concrete factors. The mind of adolescent girls is often occupied with thoughts which concern the objects of their affection. Exciting or immodest literature and plays and the influence of sophisticated associates may start the indefinite hazy, sexual inclinations into a flame." (Kisch.)

Our universities incline to athletic sport for boys and girls. Anyone with a real mind must know that our educators realize that it is not only healthful but that it diverts the mind from the sphere of sex during all these important years. Inasmuch as we are speaking of the wholesome effect of athletics and diversions of a wholesome type, let us at this point show the ability of an individual to switch an emotion into the pleasurable with the aid of the psyche and the added element of interest. Imagine yourself in the Yale Bowl watching a contest between Yale and Harvard. Harvard makes a touchdown. Immediately thirty thousand wild, enthusiastic men and women, filled with enthusiasm, are contrasted with thirty thousand who sit quiet and depressed. Yet both have viewed the same event. A few minutes afterwards Yale makes a touchdown and the thirty thousand depressed ones act like howling dervishes, while the others are, in turn, quiet. And so it is possible to switch events, occurrences, irritations, into

pleasurable or less annoying emotions by what we call diversions. And this ability is greatly enhanced if we teach an adolescent or an adult that a wholesome or injurious, psychic, physical or endocrine state is associated with habits according as these are good or bad.

Pleasant events, joyful experiences, strong emotions, mental shocks, worry, frights, etc., may make such a deep impression on the cerebral film that the mind is unable to shift or switch thoughts into other channels. This may be true of good or pleasing impressions as well as of bad ones. The latter, of course, are injurious and we often say "it makes or has made a good impression," "it makes or has made a bad impression."

Voluntary recalls of pleasant events constitute the most enjoyable and wholesome processes of which the mind is capable. Recalls occur frequently enough in dreams at frequent or infrequent intervals for short periods or for years. The innumerable factors forgotten and remembered are the prompting influences which lead to recalls in the waking state, in the dreamy waking state, and in dreams.

When a person recounts the story of any experiences, we simply have to note how his language, inflection, behavior, countenance, attitude, etc., change in accord with the recall of the various emotions belonging to that experience.

The face of a child when listening intently to a story, his expression, his color, his attitude, show simply the expression of the emotions roused through the sense of hearing. In our reading, in our observation, in the theatres, at the cinema, we are played upon, our emotions are played upon, our instincts are roused or repressed within the range of a few hours,—so we say, that we have "run the entire gamut of the emotions." And since all this involves endocrine activities a play or a cinema leaves one tired and worn, if certain emotions have been roused; pleased, with a feeling of well-being, if other emotions have been aroused. So that however one may appreciate good acting and strong plays, the tastes of most people,—especially when tired,—lean toward the pleasant and

laughter producing type. Hence we hear the critic say: "This is a play for the tired business man."

Pseudo emotions of pity and sympathy may be readily aroused; hence pleas, events, or problems concerned with children, especially affect the parental instinct and make the strongest appeal. Thus an appeal for charity is more readily responded to if the welfare of the expectant mother or the health and welfare of childern are the pleas used as channels of approach.

The effect of early impressions, the influence of one of the diseases of childhood is well recorded by Henry Adams in "The Education of Henry Adams."

"Of all that was being done to complicate his education, he knew only the color of yellow. He first found himself sitting on a yellow kitchen floor in strong sunlight. He was three years old when he took this earliest step in education; a lesson of color. The second followed soon; a lesson of taste. On December 3, 1841, he developed scarlet fever. For several days he was as good as dead, reviving only under the careful nursing of his family. When he began to recover strength, about January 1, 1842, his hunger must have been stronger than any other pleasure or pain, for while in after life he retained not the faintest recollection of his illness, he remembered quite clearly his aunt entering the sick-room bearing in her hand a saucer with a baked apple.

"As a means of variation from a normal type, sickness in childhood ought to have a certain value not to be classed under any fitness or unfitness of natural selection; and especially scarlet fever affected boys seriously, both physically and in character, though they might through life puzzle themselves to decide whether it had fitted or unfitted them for success; but this fever of Henry Adams took greater and greater importance in his eyes, from the point of view of education, the longer he lived. At first the effect was physical. He fell behind his brothers two or three inches in height, and proportionally in bone and weight. His character and processes of mind seemed to share in this fining-down process of scale. He

was not good in a fight, and his nerves were more delicate than boys' nerves ought to be. He exaggerated these weaknesses as he grew older. The habit of doubt; of distrusting his own judgment and of totally rejecting the judgment of the world; the tendency to regard every question as open; the hesitation to act except as a choice of evils; the shirking of responsibility; the love of line, form, quality; the horror of ennui; the passion for companionship and the antipathy to society—all these are well known qualities of New England character, in no way peculiar to individuals, but in this instance they seemed to be stimulated by the fever, and Henry Adams could never make up his mind whether, on the whole, the change of character was morbid or healthy, good or bad, for this purpose. His brothers were the type; he was the variation."

The Stork

One of the greatest problems which confront parents is the satisfaction of the curiosity manifested by children. They pass their early lives enjoying the delightful relationship with Santa Claus until information imparted from different sources deprives them, much to their regret, of this most enjoyable experience of their younger years. It has done them the greatest of good and inculcates, perhaps without our realizing it, the principles of good will, generosity, kindness and the love which kindly old faced, gray haired, bearded, smiling Santa has for little chilrden.

The little ones say their prayers and are carried into a state of trust and reliance in the omnipotence, kindliness and love vested in a supreme being. Thus we explain to the immature mind many of the wonders which at that age we could not explain in detail in language sufficiently simple to be grasped with understanding.

The stork and the doctor bring baby sisters and baby brothers and the little ones pray and ask for a brother or sister when the knowledge is ours that one is on the way.

But there comes a time when the mind and the curiosity, coupled with what children see, hear, read, and overhear, seek

for and demand explanations which appeal more to their reason and which, if told to them in the proper form, not only satisfies their curiosity, not only prevents them from receiving such information (often misinformation) in ways which are injurious, but here follows the most important point of all.

Children should not be led to believe that inquiry along these lines is anything but natural, and the more ready and prompt is the response, the more it is given as if the question were a perfectly normal and proper one, the more is the idea of the sex complication laid aside for the moment. Children know that cows have calves, that dogs have puppies, that chickens have chicks, that birds lay eggs and that married folks have children. It never or rarely enters their minds as to what makes a chicken develop in eggs, except the fact that a hen sitting on them, keeping them warm, allows the little chick, after a definite period, to peck its way out of the shell. Now a cow, when it has a calf, lays an egg, but if a cow were to sit on such an egg the shell would break and it might crush the little calf. Besides the cow has to eat its food, stand under a shady tree in warm weather, wander about the pasture and give its milk. Therefore, nature arranges it so that when the cow lays its egg the little calf is ready for immediate hatching.

Children know about the cross breed of dogs and it certainly hurts no little boy to have his father talk in a perfectly natural manner about the breeding of horses and the improvement in them, in cattle, in sheep, etc., according to the well known principles practiced by breeders.

I took a boy ten years of age to a sporting goods store to buy a collar for his latest possession, a well bred Boston Bull, to whom he was greatly devoted and whom he carried about as a mother carries a baby. On the counter lay a pile of pamphlets dealing with the diseases of dogs. He asked me if he might have one, and I said, "Yes, of course," after glancing over it casually. Two days afterwards he showed me the pamphlet, and on one page was a picture of forceps used in the delivery of dogs. I was startled for a moment and said, "Why, of course," if the egg won't come out of its own ac-

cord, the veterinary takes the little puppy out of the shell himself. Didn't you know that?" This was the only thing to do and was the proper thing to do, though had I known I might not have put that pamphlet in his hands at that time.

A little girl of nine years, of very active mind, in many of whose books many babies had been born, said one day, "How do babies really come? Why does the stork or the doctor bring it so late in the morning instead of in the day time, when it is so much more convenient?" It would have been perhaps a more comfortable feeling to have been able to wait until this child was older, but in the meantime curiosity, plus information given, Heaven knows in what fashion, would certainly have produced an impression far different from those the parents desire, and so I said, "You know a hen lays an egg, and keeps it warm till the chick comes out. You know a cow lays an egg, but the little calf comes right out of the egg as soon as it is laid. It is just the same way with any mother; it's all just in the laying of an egg, and the larger the little ones, the greater the danger of hurting them, if the mothers were to sit on the eggs. The sooner they come out of the shell the better. A seed is really nothing but a little egg; the only thing is that a tree can't sit on it and keep it warm," and before I had a chance to say another word the child said, "Yes, that's why its put into the ground, to keep it warm, and then the sun shines on it, and that keeps it warm too," and I said, "The sun keeps us all warm and gives us life, and makes the grass grow, and makes the leaves green, and is one of the most important things which God has given to make this world what it is."

That child's curiosity has been satisfied; a wholesome explanation has been given; one which is perfectly true and correct, and no suggestion has been put into that child's mind that the question involves anything which she has not a right to know or to understand. She was told further that this was a sweet and very personal communication between any parent and any child, and that it was not to be communicated to any other child, as every parent wanted the pleasure of telling this

to her or his own children, nor was any other explanation than the one given above the correct one, and that any future information on this question would be gladly and readily given whenever she desired.

It Pays

In teaching moral standards, making an appeal to the sense of honor or dignity or loyalty, etc., the ethical point of view can be strengthened by proving likewise that "it pays." If it is better to be honorable and honest and just and truthful, it must be shown that it is to the advantage of the individual in his relations with men, and that it contributes to the one who practices these principles a sense of happiness, well-being, and self-respect. If a girl be taught that each time that she becomes angry there is an associated endocrine reaction, which exhausts her reserve, makes the next attack of anger more readily roused and that the physical changes resulting therefrom are harmful, the impression made by the advice is increased. If girls are taught that every wholesome, pleasant emotion is associated with an associated organic and endocrine action or reaction with benefit to the body functions as well as to the mental state, the advice to smile, to be cheerful, to be optimistic, to look on the bright side of things, has more than an ethical significance.

If a man, with wife and children, develops an incipient tuberculosis and if at the expense of a certain amount of money he is sent to a sanitarium to recover his health and if at the same time his wife and family are given financial aid to keep them from want and suffering, that man comes back at the end of a year healthy and well and able for the next ten or twenty years to support his wife and children.

Aside from the glorious results to the donor and to the afflicted which results from such beneficent action, "it pays." If this had not been done and the man had been allowed to develop a more severe and probably incurable form of pulmonary tuberculosis, his earning power, his ability to care for his wife and children, would be at an end and he himself

would be a liability to the community and not an asset; and the future of that wife and children would be markedly and injuriously affected. Whether the motive which prompts such beneficent action is kindly, charitable and generous or whether it is based on an appreciation of its utility, the desirable end result is obtained.

If a young person is given advice as to morals, habits and standards based on any abstract ground of morality, ethics or religion, it is certainly advisable by warning against the dangers to one's physical self, to prove the value of morals by a realization that "it pays." If we explain the injurious physical effects of onanism, if we teach the injurious physical and psychic results of abnormal sexual practices, if we portray the dangers and frequent lasting injurious effects of a gonorrhoeal infection, if we teach that syphilis affects not only the body but the nervous system, that its destructive influence may only be evidenced in after years, often in an incurable form, that one may readily without knowing it convey the infection to his wife and through her to some or all of his children, we certainly enforce the effects of moral teaching by the knowledge that "it pays" to protect one's self and one's future and the future of those who some day may be our dearest possessions. If the sufficiently ripe mind is informed that gonorrhoea is one of the most frequent causes of sterility in the male or female, we are appealing not only to the instinct of self-preservation, but to the paternal and maternal instinct which cannot be roused too early in a wholesome fashion. The maternal instinct must be distinguished from the instinct of sex or the sex urge. We give our little girls and boys different forms of plays. The boy has his soldiers and guns, his drums and tools, his Indian suit and his soldier suit, his outdoor sports and plays, all of which are supposed to develop his normal instincts supposedly manly in type as he grows older. And so we encourage in our boys a fondness for athletics, an enjoyment in football and physical contests; we inculcate a love for the pleasures of camping, hunting and fishing. Not only do these develop the instincts which are normal and manly but they

develop the body, stimulate growth, and overshadow, cover up and anesthetize, so to speak, the instincts of sex as they appear during the years before adolescence in varying degrees according to development and the stimulation excited through the various senses.

Educators recognize the importance of these factors and it is only the unthinking mind that complains of too much athletics in our universities, for after all during those three or four years the young man is developing physically, acquiring knowledge, becoming sufficiently old to more readily realize the channels in which he can best exercise his ability in the choice of his activities, but he also profits by the example of his instructors, absorbs or is influenced by admiration of their qualities, is improved by contact with his teachers, learns to mingle with others, learns the principles of "give and take" in the intercourse between men and acquires self-confidence and a respect for culture and education which, if it is not an exaggerated concept, gives him a backbone throughout life.

Our little girls are given their dolls, their dresses, their cooking utensils, their play, their dress, their teachings. Their observation of the differing responsibilities of men and women develops instincts along different lines, the original notion being along lines tending to the acqurinig of the domestic virtues and a preparation for the understanding and practice of the maternal instincts and virtues.

Whatever we may say of the advantages of training girls to be self-reliant and to take greater interest in the activities of life formerly belonging almost exclusively to men, none of these factors interfere with the development of the more essential, attractive and charming qualities so much appreciated in mother, wife, sister or daughter.

If we realize that children are plastic material to be moulded as we desire, we make a serious mistake. You may mould until a child is conscious of what you are doing, and then it reacts to these stimuli with an ego of its own. That is the time to stop moulding and to begin educating. And it is probably better to begin educating long before this. For edu-

cation means to bring out. Therefore, it means to stimulate, to rouse, to bring out, and to give practice to the good instincts; it means not to rouse, not to stimulate, but to overshadow, cover up and not to give practice to the instincts which may be harmful to the child or to others. As different children have their instincts and the associated emotions within them of varying degrees of intensity and in varying combinations, and as these instincts appear at different ages, increasing or diminishing in intensity according to physical constitution and according to the natural development of the various physical functions, the girl's knowledge of herself must not be limited to the explanation of physiological phenomena only.

I believe as soon as older children can reason and understand, that we are privileged to talk with them about their instincts and emotions, to explain that these can be developed or held in check and that their reactions to stimuli may be controlled by repeated attempts in these directions. Then the effect of our training would be greatly increased. Even a body of soldiers led by their officers on a hazardous journey is much better fitted to execute the desired purpose if the purpose and objective of their expedition is known to them.

Why should we not study a child's instincts and emotions, its likes and dislikes, its attractions and aversions? All these things, especially as they grow older, are their personal and most intimate affairs. It is they who are ultimately concerned, benefited or injured. We are all the time, perhaps without realizing it, permitting continued appeals to their instincts and emotions. They get it through books, from plays, from the cinema, from biographies, from contact with the world, at school, in the papers and magazines. Some children and some adults are able to select the worthwhile from the pernicious. Unfortunately, however, we forget that even faults and weaknesses and vices carry their propaganda when made attractive by charms of detail or exterior, or by the result attained.

It requires even a wise person to realize that "all that glitters is not gold," and if many grownups never learn this, what

right have we to expect that children and the younger generation should see the truth of this statement?

We bring up our children with many a moral proverb or axiom; we send them to school and to college where they learn much of the abstract principles of justice; but if these teachings such as "if he smite thee on one cheek, turn to him the other," and the abstract principles of justice are not tempered with advice as to self-protection and self-preservation; if the teachings of history are not used to impress youthful minds with the facts that the world is a place of contest, and that civilization has often forced castor oil down the unwilling throats of the uncivilzed and the savage to his final betterment, we are very apt to be responsible for the development of impractical ideas of generosity, justice, and equality which are as likely to do harm as if we were to go to the opposite extreme and teach nothing on these subjects at all.

In the education of children and the young and in the whole period of one's life, for that matter, the idea is to strengthen the good instincts, to develop them and to bring them out; and to cover up and bring out as little as possible or to inhibit the baser or the injurious or the unworthy.

And since ultimately every individual life is more or less under his own direction, or associated with a partner, or in contact with varying types of natures, the earlier one learns to understand his instincts and emotions, and the earlier he understands his disposition and his temperament, the better able will he be to understand the "I" in character even though that letter does not appear in the word.

Some children have the instinct of subjection so marked that their instinct of self-assertion must be encouraged to the greatest possible extent. They should be praised, encouraged and never be made conscious of "bashfulness" or lack of initiative, or lack of courage. They recognize these failings without our knowing it, and it is better that we should not let them know that we too are aware of it. On the other hand the greatest of harm can come if the instinct of self-assertion is allowed too great freedom and practice along lines that create

the ego in too exaggerated a form, especially in the matter of pride, sense of superiority, the over-estimation of the meaning of wealth and position. Personal pride, pride in one's accomplishments, pride in matters involving dignity, reputation, standing, etc., are all along normal lines. The injurious effect of over-exaggeration of the instinct of self-assertion is well exemplified in Booth Tarkington's "The Magnificent Ambersons."

The stimulation of the best instincts and the rousing of the best emotions must not be confused with over-indulgence or with the exaggerated development of the self-assertive instinct, since the latter may result in an exaggerated ego with no adequate counter-balance by the instinct of subjection. I know no better way of exemplifying this fault than by calling attention to the "Magnificent Ambersons," written by that master psychologist, Booth Tarkington. Here the mother, whose only son is the all-absorbing object of her great maternal instinct, indulges the son to such an extent that his brave and courageous characteristics develop him in a "cock o' the walk." As a result of his subsequent notions and her yielding spirit, and her misguided adoration of her son, he unwittingly spoils her life, and her opportunity for real happiness during her more mature years. When he subsequently loses her and falls to earth, is left penniless, practically friendless and with responsibilities on his hands, he loses his arrogance and his exaggerated pride, settles down to work with most praiseworthy energy and determination. He soon realizes his previous shortcomings and proves himself to be a real man through the exercise of the very instincts and powers which were distinctly recognizable in him as a boy, and which at that time could have been properly seasoned by restraint and a sense of proper relation to his environment and to the world.

Discipline

As much as we hope that our children may learn from us just so much and more may we learn from them. Punish-

ment of whatever sort has its excuse only because it makes an impression in the teaching of a lesson. My little boy, when only four years old, while residing in the country, was told not to leave the grounds nor to go on the street alone. He was told that a wagon or an automobile might hurt him while his attention was diverted by his play. One evening the nurse informed me that he had run out into the road. I said to him, "You know father never punishes you the first time you do something wrong, because you may not have known that it was wrong, but the second time you must be punished because you have not remembered what you were told. Here, however, you did something which not only was disobedient, but you endangered your life. You didn't remember what I told you so I am going to speak to you through your skin, so that you will remember. I am going upstairs to change my clothes and then I am coming down to teach you your lesson."

Here I learned something which I number among the best lessons of my life. Without a word, without saying "excuse me" or "I promise never to do it again," he got down on his hands and knees and said, "do it now, and have it over with." You may imagine how I felt in the performance of my self-allotted task. I went around for three days feeling like a brute until my judgment finally told me that however distasteful it may be to compel a child to take "castor oil," nevertheless the end justifies the means. And so we see the disadvantages of letting any form of punishment hang over the heads of children and how unwise long moral talks and dissertations really are, when the purpose may be defeated by rousing resentment and stimulating the instinct of contra-suggestion. Discipline also develops in children the knowledge that a man in life must take his medicine. If you say to a child that you are going to do a thing, then do it.

Nowhere is the bad effect of long dissertations on behavior, and the valuable influence of prompt and immediate calm, cool disciplinary measures better exemplified than the following delightful youthful experience of Henry Adams and

his subsequent analysis of the emotions aroused by an act of discipline.

"He could not have been much more than six years old at the time—seven at the utmost—and his mother had taken him to Quincy for a long stay with the President during the summer. What became of the rest of the family he quite forgot, but he distinctly remembered standing at the house door one summer morning in a passionate outburst of rebellion against going to school. Naturally his mother was the immediate victim of his rage, that is what mothers are for, and boys also, but in this case the boy had his mother at an unfair disadvantage, for she was a guest, and had no means of enforcing obedience. Henry showed a certain tactical ability by refusing to start, and he met all efforts at compulsion by successful, though too vehement protest. He was in fair way to win, and was holding his own, with sufficient energy, at the bottom of the long staircase which led up to the door of the President's library, when the door opened, and the old man slowly came down. Putting on his hat, he took the boy's hand without a word, and walked with him, paralyzed by awe, up the road to the town. After the first moments of consternation at this interference in a domestic dispute, the boy reflected that an old gentleman close on eighty would never trouble himself to walk nearly a mile on a hot summer's morning over a shadeless road to take a boy to school, and that it would be strange if a lad imbued with the passion of freedom could not find a corner to dodge around somewhere before reaching the school door. Then and always, the boy insisted that his reasoning justified his apparent submission, but the old man did not stop, and the boy saw all his strategical points turned, one after another, until he found himself seated inside the school, and obviously the center of curious if not malevolent criticism. Not till then did the President release his hand and depart."

"All the more singular it seemed afterwards to him that his first serious contact with the President should have been a struggle of will, in which the old man almost necessarily

defeated the boy, but instead of leaving, as usual in such defeats, a lifelong sting, left rather an impression of as fair treatment as could be expected from a natural enemy. The boy met seldom with such restraint."

"The point was that this act, contrary to the inalienable rights of boys, and nullifying the social compact, ought to have made him dislike his grandfather for life. He could not recall that it had this effect even for a moment. With a certain maturity of mind, the child must have recognized that the President, though a tool of tyranny, had done his disreputable work with a certain intelligence. He had shown no temper, no irritation, no personal feeling and had made no display of force. Above all, he had held his tongue. During their long walk he had said nothing, he had uttered no syllable of revolting cant about the duty of obedience and the wickedness of resistance to law, he had shown no concern in the matter, hardly even conscious of the boy's existence."

"For this forbearance he felt instinctive respect. He admitted force as a form of right, he admitted even temper under protest, but the seeds of a moral education would at that moment have fallen on the stoniest soil in Quincy, which is, as every one knows, the stoniest glacial and tidal drift known in any Puritan land."

While evidently a man who manifested no outward evidences of affection and was not demonstrative in this respect, the old President evidently understood the nature of the grandson Henry, as can be seen from the following:

"Whether his older brothers and sisters were still more favored he failed to remember, but he was himself admitted to a sort of familiarity which, when in his turn he had reached old age, rather shocked him, for it must have some time tried the President's patience. He hung about the library, handled the books, deranged the papers, ransacked the drawers, searched the old purses and pocket-books for foreign coins, drew the sword-cane, snapped the travelling-pistols, upset everything in the corners, and penetrated the President's dressing-closet where a row of tumblers, inverted on the shelf,

covered caterpillars which were supposed to become moths or butterflies, but never did."

Nagging

If some children grow up spoiled and full of faults because of the unwise use of what is called discipline or training, it is still true that many develop well in spite of nagging. If some grow up good and excellent under admirable training and influences, it is true that some do not when under apparently the same influences. The same form of management of several children in any family is not necessarily correct; in fact it is probably decidedly the wrong view. It pre-supposes identical instincts, emotions, endocrines and inherited qualities. If we speak of the same environment for these children it is true only in the physical sense. In some children the effects of training and education are lasting; in others not. With children, as with adults, self-assertion and the saying "No" too often may lead to no worse trials than the inability to say, feel or do "No." This latter inability, dependent upon the instinct of subjection is, in the grownup, in many cases, a serious weakness, though in the family relation it is not infrequently the only quality which saves the situation. The instinct of subjection may lead to sad or harmful experiences according to environment and the character of the temptations.

Continual nagging is, for any except the most subjective, a severe irritation. Ofttimes the perpetrator is quite unconscious of the existence of this manifestation of the self-assertive instinct or the contra-suggestive tendency. Because it is a delightful bit of reading and points a moral, I must quote from "Abraham's Bosom" the following concerning the patient who had taken to bed because of an incurable illness:

"He sank back among his pillows with a sigh of comfort. He should get away from it. (His work and its obligations.) Later he made a discovery that astonished him and gave him pain. He should get away from his wife. A little thing revealed this too, as an escape. Emily had bustled into his bedroom with a cup of broth. She liked plenty of salt in her

broth, and he very little; but it was one of those small differences of taste to which she had never become reconciled. It fretted her that he shouldn't know when things were as they ought to be; and, not to fret her, he had during two-and-thirty years submitted to her wishes docilely. But today he felt privileged to put up a mild protest.

" 'Isn't there too much salt in this broth, dear?'

"Standing by his bedside, she took the cup and tasted it.

" 'No, darling. It's very good indeed. I seasoned it myself. It's exactly right.'

" 'Thanks, dearest.' As broth exactly right, he forced himself to swallow it.

"Having relieved him of the cup she went on to make him comfortable. He had been comfortable as it was, but she didn't believe it. She had always declared that if he would rest as she did he would get more repose. She proceeded, therefore, to show him how, as she had shown him how perhaps a million times in the course of their life together. Patiently he allowed himself to be pulled and shunted while the sheets were straightened and the pillows smoothed, and he composed his figure to the lines that suited hers. Patiently, too, he pretended to be more at ease than he had been before, though he was saying to himself, with some eagerness, that death would take him away from this worrying wifely affection which never let him alone.

"The anticipation gave him pangs of conscience, since they had lived together with quite the average degree of happiness, and he loved her with a deep and quiet love. Moreover, in spite of her double chin and her increase in waist-line, he had never ceased to see in her the timid, wild-eyed nymph of a thing who had incarnated for him all that was poetry in the year when he was twenty-eight. Not till after their first child was born had her bird-like shyness yielded by degrees to an assumption of authority, which in the end became a sort of lordship over him. By the time they had three children she had formed the habit of correcting the thousand and one small faults into which he fell without knowing it. The way he ate;

the way he sat at table; the way he held a book; the way he coughed; the way he yawned; the way he shook hands; the way he pronounced certain of his words; the way he gave out his notices in church; the way he allowed other men to walk over him—these, with a hundred similar details, had become the sphere of her loving conjugal discipline.

"For more than twenty of their thirty-two years of married life her comments on his oddities had trickled on like a stream that flows and stops, and stops and flows, and never dries up entirely. He had borne it all because she could at any time, even now, throw him that look of the startled dryad which touched some hidden spring in him; but the moment had arrived when he couldn't help saying that he would be glad to get away from it." (Basil King.)

Parents as Teachers

We speak of ability and brains as if they were matters of education only, when as a matter of fact they are qualities inherent in the individual. They may be moulded, modified, extended. The acquisition of knowledge, the acquirement of information stamped with a college degree, seems to be considered education. But education, to a physician, really means the bringing out of the best in an individual, the covering or overshadowing of the weaknesses. Each individual represents a certain definite amount of material from which a certain definite result may be obtained by the use of the best and most highly scientific methods. The best method would be to have a scientific, well-understanding individual for each and every child. In our schools teaching is group teaching. At the present birth-rate the average child will soon have two teachers in the persons of his parents, occasionally only one for each child. The problem then is to teach parents that amount of understanding of nature, to give them that insight into psychology which would make them the educators. Let the child learn at school its three Rs and all the other factors which enter into our idea of education. Let it learn there, if possible, the notions of patriotism, honor, manliness, integrity. Let school

and camps allow children to delve into nature's wonders and develop their animal spirits in a wholesome, healthful way. But in the hands of the parents must rest the understanding and consideration not only of the principles of heredity but the hereditary principles in their children which would make the best out of each that is possible. The association with parents, the affection of parents, play with parents, are essential to the proper development of the child. Heredity and psychology are scientific studies of the reasons for behavior. One has only to study and observe the different builds, characters, temperaments and leanings of six different children in one family to realize that in most cases the parents have six totally different problems to contend with. From the study of the principles of heredity, we know why it is possible for them to be different, but that will not solve the problem. The problem is one of application. In development we observe strikingly the element of dovetailing, antagonism, and overshadowing, presenting to us an everchanging picture until adolescence presents an individual just beginning to be ripe.

Whoever has read Booth Tarkington's "Seventeen" must have been delighted with the mother and the atmosphere of motherliness and understanding which pervades this book.

The peculiarities of youth are often enough the result of physiological developmental changes. Many of the experiences are needed as an outlet for the inward prompting; in most cases they are only phases of gradual development. Growth, maturity and what we term common sense in some cases do not appear. All do not acquire this so-called common sense, but remain of the same mental calibre as was theirs during adolescence. If individuals with psychic and mental peculiarities were observed, studied and treated with understanding of the instincts, emotions, capabilities, endocrines, etc., and with the proper consideration and valuation of these points, much harm, trouble, and unhappiness would be avoided. And it is along these lines that the physician may be and should be of inestimable value to the parents in the solving of many of their vexing problems. The physician should understand the rela-

tion of ductless glands to instincts, emotions, disposition and character as well as their all important relation to physical states; in fact medicine is concerned with bacteria on the one hand and the ductless glands on the other and it is the ductless glands which aid the living body in the perpetual contest with bacteria and bacterial infections.

Common sense and the understanding of children are not necessarily the result of education. These are qualities inherent in thousands of people born not only with the paternal and maternal instinct but with a natural and correct understanding of the nature, qualities and possibilities of each of their several children.

I have a friend, the owner of a barber-shop, Mr. Gregg by name. Seated in his chair from fifteen minutes to a half hour on hundreds of occasions, I have learned that, with his capabilities and common sense, he should have been the president of a bank or trust company. He has said to me, "I say many things for my children, but not to my children. I talk to my wife when we are at table and I know that my children are listening. I said one day (he has two sons and a daughter), "Mamma, you remember my speaking often of Mr. X. You know he had a daughter and two men were paying her attention; one was much better looking than the other, but not nearly so steady. You see they probably didn't tell her that good looks aren't everything, and that a girl wants a man who has no disease or sickness and who can be the father of children; so she had her way and married the good looking fellow, and now she has been sick ever since. She is going to be divorced; father and mother are all broken up about it; you know she is the only daughter. You just bet that any young man who comes around here looking for my daughter's hand has got to look good to me first and after that a good doctor has got to show me too just what's what."

Mr. Gregg's oldest boy wanted to study medicine and he asked my opinion. I said, "You know, it means several years at medical school, after that a hospital experience, and then a good many lean years before your son becomes self-

supporting. Can you finance him all these years, and then start him right besides?" "Yes, I can," answered Gregg. I replied, "Put it to him just that way and if he is still determined and starts in with zeal and earnestness, then he ought to be a doctor and nothing else. But with the manual training he has already had at high school, and as I judge him from my observation of the last few years, I think some form of engineering is more adapted to his abilities and he will be able to marry much earlier."

After nearly a year's preparation for his medical work, which experience and education did him much good, he felt the call of his real capabilities; is now studying electrical engineering and stands among the leaders of his class.

A Child's Future

Since instincts and emotions and capabilities are responsible for tastes, likes and dislikes, nothing is more injurious than to be fixed in an unsympathetic furrow of activity whether it be one's vocation or one's environment. Under these circumstances the best cannot be evoked but is repressed and the less valuable and more injurious emotions are aroused. Parents may believe a certain man to be well-fitted to be the husband of a daughter yet he may not be compatible and the two may not be well-mated. The likes and dislikes of children and the new generation may not be correctly interpreted in their respective cases by parents. A parent's hopes for his children may be frustrated by their instincts, emotions, dispositions and character, for these do not develop in our offspring as we will, and while they may prove less perfect or ideal than we had hoped, yet in just as many instances they are better; and neither the one nor the other may be our fault or to our credit, though they are so often enough.

What more have parents a right to wish for their children than that they should grow up honest and honorable, healthy and well, marry happily and possess enough of this world's goods to gratify and satisfy the needs of the Simple Life, trusting that their future may bring them not only

happiness but that contentment and peace of mind which comes from properly adapting self, capabilities and disposition to one's environment and to one's possibilities.

As I have quoted the wife's attitude toward her husband, and his instinct of subjection and her instinct of self-assertion, let me quote from "Abraham's Bosom" the father's attitude toward his children:

"And then, as his children roamed back one by one to see him die, it came to him that he should be glad to get away from them. That was a discovery which shocked him to the core. His children had been part of himself. They had been good children, too—on the whole. There were five of them, and their ages ran from thirty-one to twenty-one. From a worldly point of view they were all doing reasonably well—and yet they were doing reasonably well in ways that never turned to him for sympathy.

"Berkeley, Junior, was a broker in New York, and lived on Staten Island with a wife and a baby son. He seldom came home now, except for a wedding or a funeral. The father had had hopes for something more brilliant for the lad in the year when he was born; hopes that had grown with the boy's growth and followed him to school and college, only to fade when the young man struck out for himself.

"Then there was Constantia, who had been such a wonderful little girl. Beauty and cleverness had been her portion, with a command of the piano that had promised the career of a Carreno. But she had married an agnostic professor in a Western state university, where, owing to the necessity of doing her own housework, she had given up her music, while in submission to her husband's teaching she refused to let her children be baptized.

"The twins, Herbert and Philip, were in modern phases of business, the one selling agricultural implements in Texas, the other automobiles in Detroit. There was nothing a father could complain of in this. Berkeley Noone would not have so much as sighed if it hadn't been for his hopes. They had been such angelic little boys, and so quick at everything. He

had placed them in the ideal walks of life; one perhaps as a historian or philosopher, and one—one at least as a clergyman. But they had preferred the great career of making money, and, like their elder brother, rarely came home nowadays.

"Beatrice was the enigmatic one. Though but twenty-two she was restless and eager, and sometimes unhappy in ways as to which she never gave her mother or himself her confidence. Nominally living at home, she was oftener than not away on the pretext of studying art. All he knew of her with certainty was that she moved in the advanced brigade of the woman's agitation, that she had extraordinary friendships with young men, and that she smoked a great many cigarettes. Affectionate enough, but wilful and mysterious, it pleased her to keep her parents in ignorance as to her doings, once she had closed their door behind her.

"If his offspring had disappointed him it was not precisely disappointment that had worn him out; it was a sense of the futility of bringing children into the world at all. He had put his strength into theirs and they hadn't needed it. So long as they had let him, he had lived their lives with them, and shared their struggles, and suffered their pains; he had yearned and longed and looked forward for themselves. He had seen them all as children of destiny! Whatever they might become, they could never be commonplace! Even when they had crosses to carry and cares to endure, their places in life could never be anything but high ones! And now—now they were all there, each absorbed in what seemed to him a merely starveling way of life, waiting for him to die in order that they might return to it as quickly as steam and electricity could carry them. Vitally and essentially he was no more to them than the parent bird to the robin that has mated and made its nest in another tree."

Encouragement

If the influences of training, example, discipline, punishment, reward, appeal to the emotions and to the understanding

are so important in children then the same principles should hold good in adults. If it is wise to avoid instilling fear and wise to remove fears from the mind of the child, it is just as important to do so in one psychically or mentally ill.

The psychological influence of the promises of reward or punishment are exemplified in religious beliefs and teachings. As civilization advances and intelligence becomes more widely distributed, the advantages become apparent of spreading with this teaching the doctrine of morality and of moral qualities, by associating proof that "it pays." The stimulating mental effect of hope and love and reward are becoming more recognized and the harmful effects of fear and dread are becoming more apparent. One child takes readily to discipline, another child may be refractory to it because of the powerful development of the instinct of self-assertion and the emotion of elation; or because the instinct of contra-suggestion is more assertive than the instinct of subjection. Every physician knows patients who trust in him, follow his advice implicitly, and feel better when in his presence. On the other hand, there are other patients to whom one renders medical service only as a matter of duty; they are instinctively assertive and contra-suggestive; they do not follow advice or else so unwillingly, make exacting demands, expect more, and demand more immediate attention than is possible, and are rather a burden than a pleasure. But just because of this trend of their instincts and emotions, some must be treated firmly or sternly, like some children; others, like older children, must be shown the errors of their ways, though it require tact and the exercise of all one's patience. If confidence and obedience do not develop, the doctor is better off if the patient is requested to find a physician who can find the instinct of subjection. The encouragement of patients, the removal of their doubts or fears, the explanations that physical and mental asthenia or psychic excitability, etc., have a physical and glandular basis, tends to promote their self-respect and help them to retain their courage. How unwise it is to repeatedly throw upon a child reproof or blame for the manifestations of certain emo-

tions, or of forms of behavior, when the wise medical man can explain them on the basis of instincts and emotions which the very attempts at rigid discipline may bring out, to the harm and injury of the child. How many children, who are not musical and dread the tedium of practicing, are made to continue at this unsympathetic but supposedly essential element of their education, acquiring eventually a technique which they never use in after life.

A child who needs plenty of sleep, who is tired when awakening in the morning, who dresses slowly, is late at school, yawns over the school-work, is slow in completing its school-tasks for the next day, may be hypothyroid even if only temporarily, or hypopituitary, may suffer from adenoids, may be going through a transitional adjustment or readjustment of glandular and physical function, may be passing through an unrecognized tuberculous process, that process which affects most people at one time or other of their life, in the huge number of cases unrecognized, that process which finally renders the vast majority immune to tuberculosis in after life; but which persists with varying types of infirmities in those more susceptible and the less resistant.

Not only is there injustice in criticisms and scoldings of the above type when the child is really in need of medical attention, but the psychic effect of continued reiterations of words like lazy, stupid, indolent, etc., diminish the child's self-respect; and the degree to which treatment increases the instinct of subjection and diminishes the instinct of self-assertion with its normal emotion of elation and of confidence, can only be too readily recognized in after life.

After the above was long set down in writing, I saw the following lines by Joan Benedict, which I think too valuable to omit:

"We have quoted much from the late Col. Roosevelt's letters to his children. We are struck in a number of the letters with the father's way of bringing out the best in his children, his conjuring up by a mighty expectation qualities which undoubtedly were in the children anyhow, but which

this father of fathers summons to the fore by a superb taking for granted that amounts almost to hypnotism. 'I know you are studying hard,' he writes to one son at preparatory school, and though in the next letter to the same son the father says he is puzzled by the report's low marks he suggests an explanation himself in no way reflecting upon the boy's ability or industry. 'I have faith in your energy,' concludes a letter that might well have concluded another way; 'in your perseverance, your ability and your power to force yourself to the front when you have once found out and taken your line.' And again, 'you have gone in with the serious purpose of doing decently and honorably, of standing well in your studies and of getting the respect and liking of your classmates so far as they can be legitimately attained."

"All through these letters of Theodore Roosevelt to his children breathes the spirit of 'I believe in you.' The children of such a father could not fail. We can but contrast it with that of that other parental attitude, all too common, that the child is usually to blame and mostly in the wrong being a child. The parental power of suggestion goes a long way toward building up or pulling down character yet in the making."

Initiative

One might say that environment fixes the type. It is more true that types seek an appropriate environment. The man with Wanderlust wanders. The Puritans sought a land in which they could give expression to their thoughts and ideas. The pioneer sought new lands because that adventurous quality of his nature prompted him. The lazy, indifferent, unenergetic stick to failing fields, even when it is apparent that they are of no promise. John Ferguson prayed and did little else—and as a result he sacrificed his son whose impulses were strong and human, whereas the world could easily have spared the father. Most churches do not make all their pew-holders good and truly religious. It is primarily the good and religious who support the churches. The boy or man of energy and ini-

tiative seeks a sympathetic field. The less energetic, the less sure of himself, the one less actuated by a positive leaning is more uncertain of his choice. The least energetic and the least sure amount to the least. Advice, encouragement and a proper selection made for him may put him in a place most favorable to the development and use of the faculties he possesses. Nothing makes a boy or girl, man or woman unhappier than an occupation or environment for which he is not fitted. So-called "Luck" is the result ofttimes of being where "one belongs" at the right time or age or stage. A man who succeeds in business deserves his success and deserves credit for energy, foresight and push even if he have no higher education or college degree. The best of a college education, in many cases, is that it keeps the immature and hesitant from choosing before he knows what he wants.

College is necessary for the surgeons, the lawyers, the doctors, the teachers, etc., but what a boy or girl learns in four years at college as knowledge means little. If he learns how to study, to analyze, to digest, he has profited. All else he can read out of college as well as within its walls. If a man succeeds after college, he had good stuff in him and went to college for good reasons; but his collegiate education (unless tech.) did not make him, although it helped him.

The boy who after college makes no success simply did not have it in him. What sent him to college was not that impulse which, when reviewed in after life in the successful man, made that man a success. If boys or girls acquire an exaggerated notion of the meaning of a degree, if they value success too little, if they fail to understand that energy, brains are inherent qualities, they then fail to give proper consideration and appreciation to people who possess these qualities. A college girl may acquire a false sense of values; a college man oft has a false and exaggerated sense of his value. It creates a separation instead of a community of interest or respect. It interferes with team work. People are to be judged by what they do, not by what they know, and if in education we brought out ability to do, to control, to understand, to value things

properly, there would be more sympathy, more of the democratic spirit.

Soldiers do not obey officers and yield to discipline because they think or unconsciously decide to do so. It is because they know that they must and that "must" gets into their system and so by discipline a perfect machine is developed. No man can make others obey who does not know or has not practiced obedience. What is moral, right, wholesome, etc., makes a stronger appeal if one knows it is for his own good, if "it pays."

Teaching physical morality to children and young men will bring better results if taught on other grounds than only the moral or ethical. No one wishes to do what may harm him, what may be followed by severe and lasting consequences. If that picture be exhibited while the moral lecture is given, an increasing effect is produced. The nations which first adopted social refinement did it not because of highly generous or moral principles, but because they figured and knew that it "would pay."

To attain a desired result, whatever method is used, the attainment of the result is the objective, and if action does it better than words, then action is the thing. If example is more inspiring than the thing taught, then example is one of the greatest forces, as we know it to be. Imitation is at the bottom of most things the child acquires, especially in its earlier years, Hence bad associations have their contagious influences.

Advice

In "Erewhon" Samuel Butler describes a make-believe land where physical ailments are considered a crime against law and order; but moral obliquity and peculiarities of disposition and character are held to constitute illness. He says:

> "If a man falls into ill health or catches any disorder or fails bodily in any way before he is seventy years old, he is tried before a jury of his countrymen, and if convicted, is held up to public scorn and sentenced more or less severely as the case may be. But if a man forges a

check or sets his house on fire or robs with violence from a person, he is either taken to a hospital and most carefully tended at the public expense or, if he is in good circumstances, he lets it be known to all of his friends that he is suffering from a severe fit of immorality. Bad conduct, though considered no less deplorable than illness, as with ourselves and as unquestionably indicating something seriously wrong with the individual who misbehaves, is nevertheless held to be the result of either prenatal or postnatal misfortune.

"All the ordinary greetings among ourselves, such as 'how d'ye do,' are considered signs of gross ill-breeding. They salute each other with 'I hope you are good this morning,' or 'I hope you have recovered from the snappishness from which you were suffering when I last saw you.'

"There exist a class of men trained in soul-craft whom they call straighteners, meaning those 'who bend back the crooked.' The straighteners have gone so far as to give names to all known forms of mental indispositions and to classify them according to a system of their own, which, though I could not understand it, seemed to work well in practice.

"So the Erewhonians take a flogging once a week and a diet of bread and water for two or three months together whenever their straightener recommends it."

The prescription which was given to a wealthy embezzler was described as follows:

"It ordered a fine to the state of double the money embezzled; no food but bread and milk for six months and a severe flogging once a month for twelve. In making the diagnosis, the straightener was told by the patient that he feared that his morals must be permanently impaired. The eminent man reassured him with a few cheering words and then proceeded to make a most careful diagnosis of the case. He asked about the moral health of his parents. He was answered that there had

not been anything seriously amiss with them but that his maternal grandfather, whom he was supposed to resemble somewhat in person, had been a consummate scoundrel and had ended his days in a hospital; while a brother of his father, having led a most flagitious life for many years, had at last been cured by a philosopher of a new school."

In this most amusing book about an imaginary land, we see that, while they are far behind modern countries in that they do not tolerate practitioners or physicians whose function is to cure physical ills, the inhabitants set us an example in their appreciation of the fact that many mental and moral states are, at least in their opinion, truly ills. And if we are far superior to them in our attention to body ailments, I think that our present trend is towards looking to the physician to be a mental straightener, and that this trend promises to soon make us equal to the Erewhonians in that respect.

Physical processes which are associated with and due to endocrine abnormality are a most potent cause of neuroses, states of anxiety and psychoses.

It is important, however, for the physician to recognize that psychic irritations have a profound effect on patients' physical functions and mental well-being. It is of the utmost importance that he should realize that the unhappy events of life, its disappointments, its strifes, are important causal factors. A physician must decide whether a state of nervousness or irritability or excitability or depression is due primarily or secondarily to abnormal interglandular activity, the character of which he must seek to diagnose. This may be due to or influenced by conditions in the pelvis involving the uterus, ovaries, etc., since they are closely related to the endocrine chain. If so, the correction of the pelvic condition will improve not only the patient's physical, but her psychic state, and restore her to the normal. But just because a patient with a neurosis or a psychosis has a slight vaginal cervical or uterine abnormality, we should not say that it is the causal factor. The cause is often a disturbed endocrine relation and the pelvic

condition may not and often does not have anything to do with the neurosis and psychosis. It is probable that a careful history will often disclose an infectious disease or influenza as the etiological factor leading to physical, metabolic, endocrine and psychic changes. This holds true, likewise, of nephritic changes and blood pressure.

Now a physician by giving the correct explanation may modify to a great extent a patient's fears. He is able to assure her that she has no cancer, that her fibroid is not malignant, that her retroflexion and her prolapsed ovaries, while responsible for many of her local and general symptoms, do not constitute a condition that will shorten her life, that an operation for descent of the uterus or a repair of a relaxed vaginal outlet will increase her efficiency as an active person. He may, on the other hand, explain to another that she is tired and languid, depressed and inelastic because her endocrines were exhausted by a pregnancy and labor. He may explain to another that her excitability, irritability, nervousness, restlessness and various mental phenomena of the same sort appearing regularly before each menstruation are due to plus or minus of one or more of the glands in the altered interaction taking place so often at the premenstrual period. If a patient realizes that her moods and her behavior at this time are expressions of gland processes going on within her and that only to a limited degree is she responsible, in many cases, for the manifestations of this gland action, as evidenced by her attitude and her behavior, many a woman ceases to blame herself for lack of will power.

It has happened in my practice so often that I must recount a typical case. A patient who has had one baby comes to my office with her husband. He wishes to see me a moment before his wife comes in. Tells me that she is nervous and hysterical and that I should take this into consideration when she consults me. Her story—since her baby is born, she is tired and languid. Has a backache and feels a sensation of dropping down, has no desire to go out, is too tired at night to go to the theatre or to dance, is nervous, depressed or irritable,

very sensitive, cries easily. After further questioning, it is apparent that her husband is impatient, tells her to brace up, to be like she used to be. Then some relative tells her that for her husband's sake she should brace up. (That seems to be the most frequently used phrase.) She is told that she is nervous and hysterical and finally comes to believe that she is, loses respect for her will-power and is ready to believe almost anything of herself.

When this patient is examined we find the uterus retroflexed or "upside down," as we explain to the patient; her ovaries are displaced, her endocrine balance is upset and generally minus ;and she is suffering from asthenia after pregnancy and labor, from altered ovarian secretion, due to displacement of the uterus and ovaries. We assure the patient that the uterus can probably be temporarily replaced and held in position by a pessary, that several weeks of care and attention plus the tonic effect say, of suprarenal extract, pituitary extract and possibly thyroid, plus other procedures will improve her digestion and metabolism, that she will soon feel well, and the matter of operative correction of her displaced uterus can, if desired, be left for a future period.

The astounding change in the patient's attitude is apparent at once. She now knows that she is not a nervous or hysterical "wreck," because of lack of will-power; she knows that there is a physical and endocrine basis for her condition. She can now face her family and friends with the knowledge that "there is a reason" and a good one too which both she and her husband have readily understood. And what is not least in importance, the husband's attitude changes at once. He realizes that his wife has been and is ill, even though her color be good and even though she appear plump and robust. The psychic effect on both in the influencing of their subsequent behavior can be readily estimated.

It is in the power of the physician to offer advice on many novel points associated with health and mental comfort. He may advise rest before, during or after menstruation. He may advise that the douches prescribed be continued during

menstruation, which information usually startles most women though it is a most sanitary habit. Pregnant women can be truthfully informed that the foetus encased in its shell and floating in fluid cannot be altered or injured by grief, worries or mental shock on the part of the mother, that it is the product of an ovum and a spermatozoon and will develop according to the laws of heredity.

That many women suffer various annoyances, physical, psychic and mental, at the menopause is to be explained on the ground that the rearrangement of gland activity brings out latent weaknesses or produces decided changes. That such results are no more likely to occur but less likely to occur if the uterus is removed before the menopause has been proven to me sufficiently by my own experience.

Women when told that an operation will be followed by a cessation of menstruation are often startled since they have heard and thought that early cessation of menstruation changes their disposition, alters their nature and removes many of the more lovable feminine traits. We may assure them that menstruation with its premenstrual phenomena, its recurring endocrine upset, the frequently associated pain and discomfort, the loss of blood constitute the price that women pay for the privileges of motherhood. We tell them that the uterus is simply a nest in which the impregnated ovum settles and grows. We further assure them that a uterus which cannot be or should not be again used as a nest is a useless organ. We can safely assure them that while removal of the ovaries may be followed by severe flushes and flashes, the severity of which can be markedly diminished by ovarian secretion if given early enough, that removal of the uterus with retention of one or both ovaries is usually followed after a few months or years by only slight flushes and that these can be readily controlled as they appear; and that they are rarely as severe as are the annnoyances noted in many cases of normally acquired menopause at the climacterium age. It may seem strange to advise a removal of the uterus with retention of the ovaries to cure premenstrual and menstrual phenomena, and to remove the

irritation imparted to the gland chain by menstruation; but this advice I have often given. No woman is as well as she is after menstruation has ceased by orderly rearrangement of the glands at menopause.

It is possible by judicious advice, coupled with the explanation that "it pays," to aid patients in avoiding or tempering the intensity with which external stimuli act upon the emotions. A famous actress, exceedingly emotional as we call it, and remarkable for her exceptional work on the dramatic stage, had been a patient of mine for many years. She consulted me one day and stated that she was practically exhausted, not by her work alone, but by the annoyances, the violations of rules and the lax observance of the qualities of earnestness on the part of the company. The spirit of restlessness, insubordination and Bolshevism, she said, had invaded her company and she was driven to distraction. I said to her, "You must do something for yourself. You must put a screen between these irritations and yourself, pay no attention to them and determine not to notice them. The more your company see that you are irritated, the more likely they are to continue to annoy you. Secondly, you must put a shock absorber or a transformer between the observed irritations and yourself. Your judgment and your determination to be calm will diminish or inhibit the intensity of the reaction. When the mosquitos are buzzing in your room, you throw a mosquito-netting over you, do you not? You say, 'Let them buzz; I know they can't sting me and I can go to sleep.' If you find that the buzzing does keep you awake, you put cotton in your ears and so far as you are concerned there is no buzz and there is no sting. She answers, 'Why must there be mosquitoes in the world.' I replied, 'Mosquitoes and vermin, like troubles, serve an excellent purpose. They force us to be clean and sanitary or else our senses are affected by smells, our digestion is affected by ptomaines, our skin is irritated by bites and stings. It was the knowledge that malaria and yellow fever are caused by the mosquitoes bred and grown in wet, damp, dirty places, that made people keep their kitchens, yards

and out-houses clean. The experience that typhoid fever is conveyed through water, milk, etc., has made for sanitation, cleanliness and the protection of water supply. When the wealthy man with the beautiful country estate finds life made unbearable by the mosquitoes and he is told that by draining the marsh-lands about him he removes their breeding spots forever, he and his neighbors dredge a channel to an inlet or the ocean, pump sand upon the drained area, get rid of the mosquitoes, find the channel a lovely outlet for their motor-boats and find upon their hands hundreds of acres of valuable land and realize that "it pays." These little irritations put you to the test.' "

So with a little bromide and an occasional sleeping powder and an invisible mosquito-netting placed by her will-power and judgment, between the mosquitoes of her company and herself, she got along famously.

One of the most valuable things a physician can do is to use his knowledge of human nature and of medicine in imparting information, and that not so infrequently, to those misguided and misinformed young married people who wish to be relieved of a pregnancy because they are not ready yet or because they are only married a very short time, or because it interferes with their plans. They are perfectly willing to have a baby in a year or two, but they are not just ready yet. The first impulse of the physician is to assert his dignity and the dignity of his profession and to resent what is really an insult even though not so intentioned. But if the physician, figuratively speaking, puts such a prospective mother out of his office, he may throw her into hands more receptive to the suggestion. It has been my good fortune on occasion to save this life by explaining that it was morally wrong for the prospective mother to harbor such a wish; that it was morally and legally wrong for the physician to interfere with what, though she felt it not, was nevertheless a living and growing embryo; that interference could result in changes in the ovaries and other structures which might prevent her from ever becoming pregnant again and then her whole life would be marred by

an ungratified longing for offspring and a continued regret that she had of her own volition been responsible for this deprivation; that children are the greatest of all joys and that while man proposes nature knows better than to always leave in the hands of the human being the decision as to when children should be born. One would have had little respect for nature and the omniscience of the Almighty if, for instance, the sex of children were a matter which human beings could influence at all.

In his relationship with patients the physician has opportunity in a dignified and pleasant manner to bring an occasional smile to a patient's face and to tell her that smiles are like rays of sunshine. Yet he must realize that some patients are not clever and that some are contrasuggestive. In the postoperative convalescence the surgeon can cheer a patient very often by a kind greeting or a little pleasantry. I know a surgeon who, when a patient was sitting up on the tenth day after an operation, bedecked with a boudoir cap and pretty ribbons, said to the nurse, "Our patient looks so well this morning I think we ought to send for the house photographer." The patient replied, "You had better keep your compliments for your wife." The surgeon did not enter her room again during the remainder of her convalescence. If some patients are not clever it is true that an occasional physician likewise fails to understand human nature.

A very charming, dignified mother whose oldest child was twenty-one years of age, a woman who is interested in child welfare and takes part in political activities, visited a clinic and before seeing the surgeon was ushered into a room where the histories are taken. A very well-dressed and rather youthful doctor gave her a casual glance and in a perfectly mechanical manner took her history. When he finished he said, without looking up, "Well, I think we will have to put you down as that bundle of tears and nerves which we doctors call woman." The patient walked toward him and said, "I came to consult Dr. So-and-So, and not to hear your disrespectful expression of opinion concerning woman. You are apparently

a little whipper-snapper. Have you forgotten that a woman brought you into the world and cared for you for years, gave you her time and attention and probably sacrificed her health worrying over just such evidences of lack of respect as you have shown to me?" The next day when she came by appointment to see the surgeon himself, the young doctor walked into the waiting-room and said, "Oh, I have been looking for you all morning. How charming you look. You certainly do wear stylish dresses, and that coat is so beautiful in color." Amazed by this attempt at flattery she opened her coat, disclosing a red lining, and said, "Yes, this color always does make parrots talk."

Now in the many circumstances where advice and encouragement are of increasing value in proportion as the physician has the respect and confidence of the patient, and in proportion as the patient is suggestible, let the physician remember one thing. Let his relation be that of a physician and a friend, but let not a social intimacy develop. Further, any familiarity which passes beyond the limits of proper social dignity and the exchange of dignified courtesies results in the loss of that sense of awe and reverence and that sense of respect which should be felt towards the physician.

The closer the social intimacy the less does one look upon the physician as a man of medicine and the more does he appear to be a medical man.

Medical men are not without this failing; they value more highly a man whose work they have read and studied but whom they have not known. People who grow up with men of their own age, or with the younger generation, and know them, can never have quite the same feeling of wonder and respect for their subsequent attaintment and success as the young have. Parents continue to look upon their children as children, often without an adequate realization of their mentality and ability. However much a physician may feel that long visits and interesting conversations take the patient's mind off her troubles, and to that extent benefit her mental and psychic state, experience will teach men that it is the patient's

acting on his advice and not the comfort of his presence that produces lasting results. Otherwise he wastes much time, it eventually becomes a strain on his nerves, it becomes a burden of sameness and he soon realizes that it is his presence and not his mental suggestions which the patient, without knowing it, desires. And if there is anything which the physician should avoid, it is the faintest suggestion or the faintest possibility of the triangle which forms the basis for so many novels and so many plays.

CHAPTER III

AN INTRODUCTION TO THE STORY OF THE ENDOCRINES

The influence and action of the endocrine glands are evidenced by somatic, mental and psychic changes. If we can fathom and understand what the ductless glands have done to an individual up to the stage of puberty, we may appreciate why the individual develops as he does. If we can reason out what these ductless glands have done to that individual from puberty on, we may understand why that individual is what he is and why so many changes have occurred in him. If we can eventually fathom what hereditary and accidental and intercurrent factors are responsible for these gland changes and for the consequent somatic, mental and psychic factors, then medicine will have accomplished a glorious work.

You naturally expect to have a gynecologist make frequent reference to the ovary as a secretory organ, for in many ways the ovary dominates a woman's life both physical and mental. Whatever may be one's opinion concerning the internal secretion or secretions of the ovary, we all acknowledge the ovum to be its external product. Fecundation means the union of a ripe ovum and an active spermatozoon.

It must be mentioned that the germ-cells have been set aside early in the embryonic stage, that each contains the potentials of a new individual who may some day result from the union of one of these ova with a spermatozoon and from the union of the chromosomes of their nuclei.

Mendelism teaches us that the determiners of the traits of the father and the mother are brought together in the offspring. When the male pronucleus has united with the female pronucleus, in each chromosome there is carried the determiners of a number of characters instead of one. Nothing except creation itself is so wonderful as the fact that these microscopic chromosomes contain the potentials which make of the new being, procreated by a union of the male and female pronu-

cleus, an individual who resembles his parents in face or in form or in characteristics; and who develops in himself qualities transmitted from his grandparents and his forefathers.

In cell division the nuclei break up into segments which are known as chromosomes. Each type of animal has a particular number of chromosomes in the nucleus. Before ripening, the nuclei of the conjugating gametes (ovum and spermatozoon) contain only one-half of the usual number of chromosomes. The chromosomes have united in pairs instead of splitting, and one part of each pair goes into the new ripening daughter cells. In these pairs there is a chromosome of maternal origin and one of paternal origin. This takes place in the halving which occurs at maturation. When the ovum and the spermatozoon unite, the fecundated ovum then contains double this halved number of chromosomes and the usual number is restored (Guyer).

The sex chromosome in the spermatozoon does not divide. The sex chromosome of the ovum does. This sex chromosome in the spermatozoon thus causes an uneven number of chromosomes before halving, hence when maturation takes place some of the new spermatozoa have the sex chromosome and others have not. It is this sex element in the spermatozoon which, when uniting with the female sex chromosome, results in a female child. If the spermatozoon contains no sex chromosome its union with the female sex chromosome results in a male child. It is probable that the sex determiners are associated with this sex chromosome of the spermatozoon.

We know that dominants and recessives determine the character of the new being. This may be illustrated by factors which appeal to any one. For instance, as to the eyes, brown or black are dominant to blue or gray. As to the color of the hair, dark is dominant to light, black is dominant to red. As to the shape of the hair, curly is dominant to straight. As to the skin, dark is dominant to light. As to temperament, nervous is dominant to phlegmatic.

Through the action of the dominants and recessives we find that there may be transmitted color-blindness, hemophilia,

myopia, multiple sclerosis, muscular atrophy, ichthyosis, web-finger, albinism, feeble-mindedness, insanity. Among the inherited qualities are musical ability, literary ability, memory, ability in arithmetic, mechanical skill, longevity, handwriting, obesity, muscular strength and many other characteristics (Guyer).

There is no doubt that many a tendency transmitted through generations must depend upon a transmitted stability or instability of one or more of the internal secretory glands' functions. We recognize in innumerable families an instability of the thyroid transmitted through generations. Hemophilia is an excellent example of this transmission by Mendellian law. Dementia precox is another. I myself have so often observed the hereditary nature of hypophysis transmission that I could cite many interesting family histories.

Dercum shows that dementia precox is a recessive transmitted by Mendellian law. In dementia precox there is an affection of the cortex and of the vegetative nervous system. The toxins act on the autonomous and sympathetic system, affecting not only the brain but the circulation, the digestion and the pupillary reaction. This explains the emotion effects, for these are expressions through the sympathetic nervous system. Dercum finds that the internal glands are involved in dementia precox. The sex glands may dominate the picture, the thyroid may be the important element. There may be an involvement of the pituitary or of the thyroid or of the adrenals or of all three of them. Fauser found, in the serum of dementia precox patients, defensive ferments against the sex glands and the cortex. Hence the idea that unchanged gonad proteins enter the blood and cause a lysis of the cortex. He also finds defensive ferments against the thyroid, adrenals and thymus.

Now that we know the important relation existing between the various secretory glands, and among these the ovary and the testicle are not the least important, we can understand that in dementia precox menstruation is delayed or that there is sexual precocity, for menstruation is a pluriglandular cyclic

process. We can understand sexual excesses, vagaries and perversions. It is easily understood why the symptoms are brought out or accentuated by menstruation or brought on by pregnancy, repeated pregnancy, or by miscarriage. Hence *dementia precox is a serious and extreme type of endocrine aberration or abnormality evidencing its presence by psychic rather than somatic alterations.* So as we delve into one mental aberration after another, the internal secretory glands seem to be more and more related to conditions characterized by psychic manifestations.

The physical and mental development of the individual are dependent on the action and interaction of the ductless glands. The nutrition of the body, of the mind and of the sex organs, as we are learning more and more, are dependent on the trophic stimuli of the ductless gland system. Long before the trophic relation between the various glands and the ovary is evidenced by menstruation and development of the secondary sex characteristics, these glands are concerned with the body growth.

The physical and mental development of a growing child is dependent upon the activity of the hypophysis gland and particularly the thyroid gland. Bony growth is of course related to calcium metabolism and here the thymus and the parathyroids and adrenals are of importance. The thymus and the parathyroid glands are particularly concerned with calcium metabolism and, to this degree and probably in ways which we do not yet understand, they are intimately associated therefore with bony growth and the development of the skeleton. We do know that hypothymism causes short bones, thin bones, fragile bones. We know the lack of physical and mental development in cretinism. We know that dwarfs may also be due to an underactivity of the hypophysis gland.

In hypopituitarism, if there is a diminished function of the posterior lobe before puberty, and a consequent failure of stimulation of the uterus and ovaries, we have a resulting sexual infantilism and an absence of menstruation. In the type of Froelich we observe a failure of skeletal and sexual

development. If hypopituitarism of the posterior lobe occur after adolescence, genital dystrophy results, that is, a *degeneratio adiposogenitalis.*

On the other hand no excessive action of the thyroid will produce a giant, but excessive action of the hypophysis gland, particularly the anterior lobe, does produce normal giants and in excessive cases such giants as we see in the circus.

The adrenals are developed from the same region as the ovary, in fact they both come from what is known in embryology as the genital ridge. The thyroid in addition to its numerous stimulating and protective functions is distinctly a sex gland, particularly so in the female, as may be recognized from the fact that thyroid diseases are from six to eight times as frequent in the female as in the male.

The attention of every one is called to the sex activity of the pituitary gland because of the well-known action of pituitrin in labor, Early development of the body with sexual precocity may be due to an involvement of the hypophysis gland, of the adrenals or of the pineal gland or of the testis. Cases of this type with tumor throw a decided light on the relation of these glands in the way of over or underactivity to the physical, mental and sexual development of the growing child. The difference in the skeleton of the female and the male, the difference in the shape of the pelvis, the larger hands and feet in the male show to us that *in the two sexes bony growth must be modified to a certain degree by the action of the ovaries on the one side and the testes on the other side.* Our attention here must be given particularly to the hypophysis gland.

Let us see in what way its activity is modified by the fact that the female has an ovary and the male has the testis. Practically all the glands of the body are concerned in physical development, in the development of the bones and in the mental phase of development.

The physical build and the secondary sex characteristics of the male and the female differ to a decided degree. It is impossible to conceive of two glands so different in their action

as the ovaries and the testes without coming quickly to the conclusion that they must modify in a decided degree the relation which the other three glands bear to them, referring here again to the thyroid, the hypophysis and the adrenals. The question may be answered at first hand by the statement that the ovary has an effect on the female and the testis has a specific effect on the male. But their action is in all probability not one exerted entirely per se, but due to an action stimulated or inhibited in the other glands, that is, *the interactivity or activity of the other glands is altered.*

The interstitial cells of Leydig in the testis are intimately concerned with the changes which produce the bony growth and the male secondary sex characteristics. They are related not only to the heavier bone development, the shape of the male pelvis, but also to the growth of hair and beard, the more generous distribution of hair and changes in the voice.

Changes of an entirely different nature occur in the female. We have the smoother skin, the lesser distribution of hair, the absence of hair on the face, the difference in the voice, a more generous layer of fat under the skin, a development of the nates and the typical shape of the female pelvis.

The testis in the male produces such a change in the adrenals, in the pineal and in the hypophysis that by its own action and by its stimulation of these other glands, the characteristic qualities of the male are produced. It seems as if this type of function in the hypophysis were more active in the male than in the female. This gland has much to do with the growth of hair and with the character of the skin and with the bony framework. In other words, *the anterior lobe of the hypophysis is more a male than a female gland and the posterior lobe is more a female than a male gland.* So with the thyroid, which is more of a sex gland especially in the female than is generally appreciated. The ovary does not stimulate the anterior hypophysis and the adrenal cortex to the same degree as the testis does. There is less stimulation or a relatively slight inhibiting action on the hypophysis by the ovary which results in a different distribution of hair with

lighter and more gracile skeleton, small hands, smooth skin. This speaks for a certain degree of antagonism in this specific phase, between ovary and hypophysis. Another evidence of inhibition seems to be introduced by early ripening of the ovaries.

The thymus gland is supposed to have an inhibiting effect on the gonads, preventing their too early development. At the proper time the thymus and the pineal are supposed to regress and the inhibiting influence on the development of the gonads being removed, the latter come into their function at the normal time and in the proper way. A prolonged action on the part of the thymus inhibits the early development of the gonads; a too early regression of the thymus favors their early function. This action of the pineal and thymus seems to be more pronounced and frequent in the male than in the female.

Early ripening of the ovary often has an effect on skeletal growth, resulting in slighter stature with short legs, whereas late maturation of the ovary results in a larger individual. The relation of the ovary to calcium metabolism may be further observed by the fact that excessive action of the ovaries may abnormally increase the calcium output. The condition known as osteomalacia is to be considered as an example. So far as the ovaries are concerned we are as yet by no means settled as to the various elements contained therein. All the elements of the ovary promote uterine hyperemia. Extract of the interfollicular tissue and of the hilus diminish contractility of the uterine muscle and of all muscle fibers when immersed in these fluids. This extract likewise diminishes the coagulability of the blood. Injection of tissue-juice, experimentally carried out, injures the follicles.

The liquor folliculi, extract of the follicle lining and corpus luteum increase the contractility of uterine muscle and of all muscle fibers when immersed in these fluids. Corpus luteum increases the coagulability of the blood. The injection of corpus luteum into the veins causes thromboses. Corpus luteum dilates the cerebral vessels.

We distinguish the granulosa lutein and the theca lutein. This latter so-called interstitial structure is said to be responsible for the secondary sex characteristics in the female as the interstitial cells of Leydig are said to be responsible for the secondary sex characteristics in the male. If so, this interstitial substance may have an inhibitory effect on the hypophysis anterior lobe. It is claimed by Schafer and others that menstruation is due to this element of the ovary and not to the follicles or to the corpus luteum. These theca cells are derived from the stroma and not improbably from the interstitial cells (Schafer). It is claimed by some that the corpus luteum is developed from stroma cells. Others hold that the luteal cells, at least in part, are derived from the epithelium which originally lined the follicle. While all the elements of the ovary promote uterine hyperemia and hyperemia of the external genitalia, there are two hormones in the ovary, one which prevents or diminishes contraction, while the other contracts muscle, excites it or renders it sensitive to contractile stimuli.

The possession by the ovary of hormones having an opposite action is paralleled in the pituitary body which contains hormones having totally different effects on different structures in the body and at least two hormones which are opposite in their effects, as may be seen from the following: Pituitrin comes from pars nervosa and pars intermedia of which the pars nervosa acts upon the blood-vessels. Its action on the blood-vessels is a direct one and not due, as the suprarenals, to a stimulative action on the sympathetic nervous system. While pituitrin contracts the blood-vessels in general, the kidney vessels on the other hand undergo dilatation and the kidney cells themselves are stimulated directly. The diuretic action of the pituitary is not antagonized by atropine. The posterior lobe of the pituitary yields more than one autocoid. A specific hormone affects the secretion of milk, quite possibly the effect upon the uterus is due to another, while there is little doubt that the fall of blood-pressure produced by a second dose of pituitary extract is due to a chalonic agent entirely different

from the hormone which causes the initial rise. There is, however, no tachyphylaxis as regards the effects on the uterus. There is no tachyphylaxis as regards its effect upon the kidney. There are two autocoids opposed in their effects which act upon intestinal muscle, one producing inhibition and the other contraction (Schafer).

Before menstruation develops, however, the shape of the female pelvis is advanced in its development and we have credited to the ovarian secretion in the earlier years *a definite relation to the hypophysis and other glands, of a somewhat inhibitory character as regards the anterior lobe of the latter particularly, compared with the action of these glands when influenced by the testes.* This inhibition is more marked still after menstruation develops. When menstruation develops the corpus luteum is normally developing each month, coming into play with other glands, and thus we have a relatively new secretion, a secretion both inhibitory and stimulative to the hypophysis, thrust into the economy. Therefore thirteen times each year in normal cases there develops in one ovary or the other, a corpus luteum which is a gland of marked secretory influence. This reacts upon the thyroid and the posterior hypophysis particularly. It stimulates the thyroid in anticipation of pregnancy; it should inhibit the posterior pituitary to avoid uterine contractions. There is no question in my mind that the posterior lobe of the hypophysis is intimately connected with menstruation and that the ovaries *and the posterior lobe of the pituitary have trophic control over the well-being of the uterus and the adnexa.* The uterine lining swells each month into the menstrual decidua, producing a secretion which reacts on the ovary. Ovarian secretion and the corpus luteum react upon the decidua. At menstruation blood is thrown off and a stimulus by the posterior lobe of the pituitary is undoubtedly exerted. In all probability many cases of excessive pain and uterine contractions during menstruation resulting in dysmenorrhea are due to excessive activity of the posterior lobe at these menstrual epochs aided by the action of corpus luteum.

It is interesting to note the influence of the premenstrual stage. On questioning patients as to the symptoms by which they recognize the onset of the expected menstruation, one notes that there is no warning in many. In others there is a slight fullness of the breasts, in others a sensation of weight in the pelvis, in others there may be backache, others have slight pains a day or two before menstruation. However, a goodly number of patients note the approach of the next expected menstruation by the onset of nervous symptoms. Some are depressed markedly, others are irritated. Many become so nervous in the few days before menstruation that a marked interglandular instability is certain. They are irritable, restless, cry easily, some are alternately depressed and excited, giving rise to what I have termed constitutional dysmenorrhea.

When we realize the influence of the ovarian secretion and the corpus luteum with its tendency to dilate the cerebral vessels, when we take into consideration the swelling of the thyroid with a probability of actual hyperthyroidism being present in many cases, when we consider that changes take place in the hypophysis gland, particularly the posterior lobe at menstruation, we may realize how a sensitive or unstable relation of these three glands may cause patients to suffer for the few days before each menstruation, and this apart from the distress of dysmenorrhea. *Dysmenorrhea, amenorrhea and menorrhagia may be the somatic evidences of endocrine abnormality. Constitutional dysmenorrhea is the psychic evidence of this abnormality or instability.*

Menstruation is a miniature labor, labor is a magnified menstruation. The hypophysis reacts at menstruation in the same way that the thyroid does and the posterior lobe particularly is closely concerned with the menstrual function. At full term we have the ovary and the pituitary extract acting again as they do at menstruation after a period of two hundred and eighty days, during which time their menstrual function has been inhibited by the presence in the uterus of the placental gland. At the menopause or change of life period we have a regression of the ovarian function with a coincident alteration,

in normal cases, on the part of the thyroid, adrenals and alterations on the part of the hypophysis.

Since every ductless gland is influenced by hyperactivity or hypoactivity of any of the other glands in the cycle, it can be readily seen why we have instability of gland function so particularly marked in the female. Hence the thyroid and hypophysis are being played upon thirteen times each year by the menstrual function. These glands are affected and markedly so by pregnancy, miscarriage and by labor. In pregnancy the anterior lobe of the hypophysis evidences increased activity, the gland finally becoming larger and remaining thereafter always somewhat enlarged.

Since the entire coördination between the glands is often upset at the menopause period we can readily account for the nervous phenomena so frequent in the female; for it requires only a slight study to determine that the thyroid, adrenals and the hypophysis are very essential to a normal, stable nervous system and normal cerebral activity. If we as gynecologists lay great stress on the importance of ovarian function it is because the function of the ovary, as manifested by menstruation and premenstrual symptoms particularly, is an *index* to its relation to other glands and to the element of acquired or inherited instability.

In some instances of ovarian instability hyperfunction or hypofunction may be primary, but in very many instances its relation to the thymus, thyroid and the hypophysis is so close that the result is secondary. From whichever point we approach this question, *it may be stated that altered ovarian function as evidenced by menstruation, is an index and an evidence that there is an upset somewhere in the endocrine chain.*

The thymus acts on the growth of bone as does the thyroid. In underfunction of the thymus the bones are shorter, thinner and more fragile. Early retrogression of the thymus results in large hyperplastic ovaries. Hypoplastic ovaries may indicate a persistent thymus.

The relationship of the thymus to the testis seems to be more marked than the relationship between thymus and ovary.

It is possible that in some cases hypoplastic ovaries may be related to the status thymicus where we find the large thymus, the large lymph glands, large tonsils and follicles at the base of the tongue, a narrow aorta and a large pale heart. In this connection it may be mentioned that this type of case is associated with suprarenal insufficiency. The status thymicus is not infrequently associated with Graves' disease and the opinion has been expressed that Graves' disease may represent a hyperthymus state. *Hence the diminished menstruation in many cases of Graves' disease.*

With hypoplasia of the ovaries the uterus develops poorly. Menstruation is diminished, delayed or absent, and the secondary sex characteristics are less well marked. The reproductive function of the female may not be impaired even if sex characteristics are wanting. Trichosis of the male type may be manifest, which again speaks for a removal of the inhibition of the anterior lobe and adrenal cortex which we have mentioned as one of the functions of the normal ovary.

Infantile uterus, hypoplasia of the uterus and adnexa, poorly developed secondary sex characteristics, late menstruation are an evidence either of primary involvement of the ovaries and genital tract, or a secondary influence exerted upon them by the thyroid, hypophysis, adrenals, thymus or other glands.

Each case must then be studied to determine the primary condition. Whatever condition be the cause, stimulation of the ovaries and of the genital tract by the administration of ovarian extract and ovarian residue is essential whether thyroid or hypophysis be given.

The amenorrhea of lactation associated with lactation atrophy is due to the influence of the mammary gland secretion. The mammary gland under the stimulus of nursing, elaborates the hormone which contracts the uterus and antagonizes ovarian activity; and excessive action of this type associated with amenorrhea, eventually results in an atrophy of the uterus and an inhibition of ovarian function which in the huge majority of cases can be readily overcome by the ad-

ministration of ovarian extract or ovarian residue, particularly if iron, arsenic and thyroid be added.

Chlorosis is so much a disease of the adolescent stage, so almost inevitably found in girls, that the good results of ovarian extract or ovarian residue extract when used here and supplemented with iron and arsenic can be readily appreciated.

A decided atrophy of the uterus which occurs occasionally after a too thorough curettage, can be understood when we realize that the endometrium stimulates the ovary and the ovary stimluates the endometrium; and if too thorough a curetting be done and the stimulation exerted on the ovary and follicles be lost, we get an atrophy of the uterus which in some cases is hard to overcome, particularly if in these cases there exists an underfunction of the posterior lobe of the pituitary and its nutritional value is lost or if there is dyspituitarism.

In young women with constantly accumulating obesity there occurs very often a diminution of the ovarian function and of menstruation, with an atrophy of the uterus and ovaries which, in many cases, no method of treatment will overcome. Here we are dealing with various grades of what is known as *degeneratio-adiposogenitalis,* a condition due to an underfunctioning of the posterior lobe of the pituitary gland after adolescence. Here the endometrium and ovary lose the stimulus necessary to their activity, the uterus loses the automassage produced by the pituitary gland. In many instances even large doses of ovarian extract or thyroid extract supplemented by hypophysis extract are of little avail. However, in all cases of diminishing menstruation, extracts of the ovary are indicated. This may seem very simple as a general proposition but when we analyze it we find it is because the other glands too are affected thereby that this ovarian therapy in the field of nervous and mental diseases is so marked.

In acromegaly, a diminution of ovarian and uterine function, a diminution in menstruation, impotence on the part of the male are so marked that it is almost a temptation to agree with some of the foreign authors that the primary disease is sometimes located in the gonads.

If the hypophysis and its diseases act on the ovaries as is the case in acromegaly, in hypopituitarism and dyspituitarism, why may not the reverse be true? If the ovaries are affected by the infectious diseases of childhood or by the diseases and infections of adult life, and a hypoovarianism results, why may we not get a lack of inhibition of the anterior lobe and a lack of stimulation of the posterior lobe of the hypophysis? The former would then give us the male type of pelvis, the male form of trichosis, and from this point on the various grades of increased activity of the anterior lobe. The latter would give us the tendency to obesity and the high sugar tolerance and the various gradations of posterior lobe insufficiency.

If the thymus inhibits the ovaries why may not the reverse be true? Then the infectious diseases of children or a primary involvement of the ovaries by making them hypoplastic would result in a persistent thymus and a tendency to the status thymicus. If mumps, for instance, may result in an involvement of the testicle, the same effect may be produced unrecognized in the ovaries, and I have recognized several such cases.

If hyperthyroidism, with or without hyperthymism, is so frequently associated with diminished ovarian function and diminished menstruation, why may not the reverse be true? Why may not ovaries hypoplastic or affected by infectious or hypoactive through lack of proper stimulation result in relative hyperfunction of the thyroid with many of the symptons of Graves' disease minus the exophthalmos and the goitre? Why may not ovaries inefficient as to their secretion, due to lactation or to so-called small cystic degeneration, associated with diminished menstruation cause a condition of relative hyperthyroidism? We know that persistent corpora lutea do cause hyperthyroidism.

In the climacterium, especially with rapid diminution in ovarian function, a state of relative hyperthyroidism is of frequent occurrence. This parallels the important question of primary ovarian involvement after puberty, especially the changes connected with abortion, pregnancy and labor and

inflammations. The latter, particularly, results in changes in the tunica albuginea and in the retention of numerous follicle cysts. Ovarian function is disturbed, evidenced somatically most often by excessive menstruation, but often enough by diminished menstruation. With or without such changes we must count on this altered ovarian function, either excessive or diminished, as having a direct connection with those glands most intimately associated with the gonads. The balance of the endocrine cycle may be upset, particularly so in the unstable cases. Instability or lability is thus first brought to our attention. Hence the nature of the interglandular manifestations are various in type and form, conforming to no definite course and picture. The symptoms may be purely somatic. *They are, however, often enough psychic.*

Now we come to the opposite extreme, overactivity on the part of the ovaries, evidenced by menorrhagia or metrorrhagia. Here we find greater difficulty in accomplishing a therapeutic result. Novak finds that corpora lutea with marked development of the paralutein tissue often are associated with excessive menstruation. The degree of uterine bleeding is *not related* to the amount of lutein tissue found in the respective ovary. Whereas the ovarian extract or ovarian residue helps in cases of hyperthyroidism, thyroid does not do so much for the cases of hyperovarianism. We must look to other glands. The mammary gland extract is an excellent thing in many cases of menorrhagia because of its well-known action as evidenced by lactation atrophy. Nursing tends to inhibit ovulation, the purpose being to avoid menstruation and intercurrent pregnancy. The thyroid helps in some cases of menorrhagia, especially in those cases due to an undersection, a relative state of myxedema.

Since the thymus is antagonistic to the ovary, it would seem to be of value for ovarian hyperactivity, for overgrown endometrium, for masturbation and for menorrhagia. I note that this extract has received little attention for this indication and yet it has proven in my hands to be exceptionally valuable in the persistent menorrhagia of young girls, when all other

drugs or extracts have failed. In the persistent menorrhagia and metrorrhagia which occasionally follows the ideal vaginal operation for prolapse of the uterus it has served me well. In the persistent bleeding associated with fibrosis uteri it is occasionally effective when used in combination with ergot or ergotine and mammary extract.

Recently our attention is being attracted to the value of placental gland extract in cases of menorrhagia and metrorrhagia. Theoretically it would seem to be the proper thing to use, because the moment that pregnancy takes place, the secretion from the outer covering of the ovum inhibits the menstrual stimulus produced by the ovary, adrenals and the posterior lobe of the pituitary gland. During pregnancy there is antagonism as to menstruation between the pituitary, ovary and adrenals on the one side and the corpus luteum, thyroid and placenta on the other.

I should like to discuss what I have called . . . *The higher up theory of sterility* . . . I do not want to decry the operation of dilatation of the cervix or discision or any other method of cervical operation for sterility, but I feel that we have spent entirely too much time at this point of attack and have concentrated our thoughts on the area which is not at all responsible in a large proportion of cases.

One might safely say that it is hard to keep a good spermatozoon from passing through the cervix and it is very hard for a poor spermatozoon to pass upward even through a roomy cervix. Spermatozoa pass upward from their own motility, possibly a form of attraction is responsible for this upward movement. The fact is that the ciliated epithelium acts downward and creates a current against which they move, and it is possible that their inclination is to move against the current. They pass out from the uterus into the Fallopian tubes. Anyone who has seen the lumen of a Fallopian tube at the interstitial area, the part passing through the horn of the uterus, knows how extremely narrow this area is. Therefore a spermatozoon that can pass through a Fallopian tube of this sort ought to be

able and ought to pass up through any stenosis of the non-catarrhal cervix.

The lining of the uterus may not be adapted to the embedding of an ovum. Its character may be so altered by secretion or some other condition that an ovum cannot imbed itself or if it does is expelled very early. We have a large proportion of cases in which spermatozoa are present in the partner in whom no cervical or uterine inflammation is to be found.

Granted that the spermatozoa are active and can pass upward, the most essential feature for fecundation is the production by the ovaries of ova capable of fecundation and then of passing into the uterus by the action of the ciliated epithelium of the tubes. It is not generally recognized that the ciliated epithelium of the tubes is and must be under the trophic control of the ovaries, probably of the thyroid and very probably of the pituitary gland. One will be surprised at operation in sterile women and in cases of one child sterility, to see the atrophic state of the Fallopian tubes, slight, thin, deprived of their musculature. In all probability the ciliated epithelium does not act. This condition is undoubtedly responsible in many instances for sterility, especially that type of sterility where patients have for years and years been sterile, and finally with treatment and more frequently without treatment become pregnant.

Associated with this condition, and very frequently they go hand in hand, is a condition in the ovary where ovulation in the strict sense does not take place; that is ova are not thrown out. The ovaries are filled with cysts, the trophic control of the follicles by the thyroid, the interstitial ovary, by the pituitary gland, is exerted in a sense *but does not stimulate enough or sufficiently* and these Graafian follicles come to a certain point and do not rupture. A very thick tunica albuginea may likewise be responsible for this but the lack of trophic control by the endocrines is a frequent factor. Loeb found that extirpation of the corpora lutea in the guinea-pig accelerates the bursting of ripe Graafian follicles which indi-

cates that the presence of corpora lutea inhibits ovulation. The corpus luteum of pregnancy inhibits the ripening of follicles. Many ovaries contain these small atresic follicles, they contain corpus luteum rests, occasionally corpus luteum cysts *and thus an inhibition of ovulation takes place.*

Here again we have the cases where as a result of treatment and very often without treatment, or due to a change of air, or scene or often through a prolonged course of travel, the inhibition is removed and ovulation does take place with subsequent pregnancy.

While the corpus luteum is an important product of ovulation, one must not underestimate the value of the ovary itself. This part may cause regular menstruation and yet ovulation or the ripening of a Graafian follicle for the production of an ovum does not take place.

We next have the large hyperovarian condition consisting of those ovaries known as the oyster ovary. There is a great deal of interstitial tissue and there may be a very slight production of Graafian follicles. These cases not infrequently show the surface studded with small-sized atresic follicles projecting above the surface. In these cases the tunica albuginea is not thickened, ripe ova frequently are not produced or expelled and yet ovarian secretion is present. These cases often menstruate and menstruate excessively. If in cases like these the ovum is thrown out, the corpus luteum is produced and it may be that the ovum does enter the uterus but the stimulative effect of the ovarian secretion, probably aided by the pituitary, overcomes the trophoblast secretion of the ovum when it imbeds itself and so the ovum does not inhibit menstruation and it is thrown off at the regular menstrual period or occasionally a few days later.

So we have the type of sterility due to conditions of the ovaries that are not inflammatory in nature, the hypoovarian type where ovulation does not take place because of ovarian inefficiency, the primary condition often dependent on lack of hypophysis stimulation. We have cases where the ciliated epithelium of the tubes does not act, cases where the tubes are

too narrow, either in the sense they have not developed or they have become atrophic afterward. Then we have ovaries with contained atresic follicles, corpus luteum rests or corpus luteum cysts, follicle cysts which inhibit ovulation. We must add that hyperpituitary type where imbedding of the ovary does not continue and where repeated probable early casting off of the fecundated ovum takes place. In connection with this study of sterility it is of interest to state the following observed in the cow:

In the cow the corpus luteum is about 5/6 inch in diameter. It remains for the 310 days, that is 280 days plus 30 days postpartum. (Metritis and pyometra of abortion, at premature labor or at full term, may cause the corpus luteum to remain permanently in the ovary.) If there is no pregnancy, the corpus luteum shrinks to one-fourth of its size twenty days after the estrum, and a new corpus luteum appears in the other ovary. If there is no pregnancy, the corpus luteum may form a corpus luteum cyst which tends to prevent ovulation, but often other corpora lutea form and develop into cysts. Small cysts in the ovary are inimical to breeding but not prohibitive. They may cause nymphomania and a remarkable laxity of the broad ligament. Larger cysts 4 to 8 inches in diameter destroy the ovarian tissue, but the other ovary may be normal. Hypertrophied yellow bodies, ovarian corpus luteum cysts if squeezed out are followed by ripening of a corpus luteum in the ovary very quickly.

To repeat: On the one hand we may have primary or secondary involvement of the ovaries with injury to the follicle and interstitial apparatus and diminished or absent menstruation. On the other hand, we may have primary or secondary involvement of the ovaries with no ovulation, and yet menstruation is not diminished or it may be increased.

In the glandular therapy of sterility we administer by mouth ovarin, corpus luteum extract, hypophysis extract, especially posterior lobe, thyroid extract, suprarenal extract. Hypodermically we administer ovarian residue, corpus luteum extract, pituitrin, adrenalin. An excellent combination is pitui-

trin combined with adrenalin, but this must be used in small doses at first for hyperpituitary and hyperadrenal patients react with too strong doses and evidence pallor, tremor of the hands and occasionally a decided shakiness of the extremities. This procedure is then of great diagnostic value since it contraindicates the use of these extracts.

The surgical treatment of this form of sterility is of interest. I have had brilliant results in several cases associated with menorrhagia by performing a wedge-shaped excision and removing from each ovary the thickened tunica albuginea and the numerous atresic follicles, corpus luteum rests and occasionally a corpus luteum cyst, all of which elements by their presence and by their inhibitory influence may prevent the bursting of follicles and the liberation of the ovum. These excellent results are not obtained in the cystic conditions of the ovary or with thickened tunica albuginea if menstruation is diminished or slight in amount. In all these cases care must be taken to split the ovary, remove the cysts and save as much of the ovarian tissue as possible.

A very frequent condition in women is *asthenia,* a condition particularly noticeable in the postpartum period, persisting in many cases for months and in many cases persisting permanently. The individual is entirely changed, she never regains her former tone, has a laxity of the abdominal muscles, has a gastroenteroptosis; there is nephroptosis, hysteroptosis and a decided lack of tone in the circulatory apparatus. Some cases suggest a mild form of myasthenia. In the study of the element of asthenia, especially postpartum form, we must take into consideration the fact that during labor the placental gland has been active and that this has a marked effect in a stimulating and inhibiting way on the other secretory glands of the body. Placenta is a new element and it is in constant opposition to the protective glands of the body. The thyroid, ovary, adrenals and pituitary are put to the test in pregnancy, and even if victorious, the thyroid, but especially, the adrenals and pituitary, are exhausted in many instances.

The rôle of the parathyroid must be of importance in pregnancy. The principal rôle of the parathyroids is their control over calcium metabolism. Calcium moderates the activity of the nerve cells. With too great a loss of calcium the patient is in an excitable state. With a diminution of parathyroid secretion, tetany may occur more readily if the subject becomes pregnant or is injected with placental extract or if she nurse. Hence we should give parathyroid in chorea, in epilepsy, in eclampsia. In Graves' disease the parathyroid is often involved. Excessive action of the parathyroid is supposed to be responsible for myasthenia gravis. The parathyroid to a certain degree restrains the thyroid and since they are antagonistic, we are advised to give parathyroid in Graves' disease but not in myxedema.

The ovary, too, is related to calcium metabolism, and we have in osteomalacia what may be considered as excessive action. While it has been claimed that osteomalacia is due to the withdrawal by the pregnant uterus of the adrenalin from the osseous tissue, since adrenalin furthers the absorption of calcium by the osseous system, nevertheless 83 per cent. of the cases of osteomalacia are cured by castration. We know that castration causes an increase in growth and in the length of the bones.

Acromegaly and osteomalacia are opposite conditions as regards the ovarian state. While osteomalacia may be benefited by adrenalin, it is benefited more markedly by pituitrin and the pain in the bones and general motility are thereby improved.

The adrenal cortex is enlarged in pregnancy. In the early months of pregnancy, however, there is a change of certain functions of the adrenals. Changes occur later in the adrenal cortex cells which give evidence of a secretory alteration. Chloasma uterinum and pigmentation may here find their explanation. The placenta may be responsible for the adrenal action in this particular. The adrenals aid and protect against intoxication. The placenta has in all probability normally an antagonistic restraining action upon the posterior lobe of the

pituitary. It has been antagonized by the other glands of the body, the thyroid and adrenals, for the protection of the system, protecting the body against too great an invasion by the chorionic epithelium, protecting the system against the toxemia of pregnancy.

The balance of the endocrine system has been upset, there is often after labor an underfunction of the hypophysis, of the adrenals and of the thyroid, a postpartum asthenia. Hence glands may evidence a tendency to fatigue and for that reason the degree of asthenia may be so marked in a patient in whom these glands are not normally over strong, that the resulting condition may last as I have said for months and years.

As regards pregnancy let us say that hydatid mole and chorioepithelioma are *local somatic evidences of placental aggression.* Let us say that eclampsia is the *systemic evidence of placental aggression* and let us call *puerperal mania and puerperal psychoses the psychic evidences.* Let us call *asthenia postpartum endocrine exhaustion due to placental aggression.*

In many cases we may benefit these patients decidedly by the administration of one or other of these glands, with ovarian extract too if that is indicated. Many patients improve quickly while in others the course of progress is very slow.

In the consideration of asthenia we must remember that the hypophysis has an anterior and a posterior lobe, the anterior lobe being concerned with physical development and physical strength, while the posterior lobe is more intimately concerned with genital function. Hence in asthenia if menstruation be normal the anterior lobe is the more important extract to administer. The relationship of the anterior lobe to various functions is more marked in the male than in the female, accounting for the greater strength of the male. In many women in whom the anterior lobe plays a more than normal part, we have the large body framework and the great strength. If there be no coördinate activity of the posterior lobe, there is either a diminished development of the genitalia or the diminished tendency to feminism. With these facts in

mind we may realize the stimulative action of anterior lobe extract in asthenia. Blood pressure in these cases may be extremely low. Indications for the administration of suprarenal extract and pituitary extract for long periods is decided. I have a strong suspicion that the anterior and posterior lobes are antagonistic as regards their action on the female genitalia. Hence in giving anterior lobe extract in cases of diminished menstruation, posterior lobe extract and ovarian extract should likewise be given.

We must not in our zeal for endocrinology overlook the essentials of medical treatment. Iron, arsenic, overfeeding, baths, massage, change of air and scene, and other medical measures are of the greatest importance, and the action of many of these methods is probably directed to the stimulation which is exerted not only on the system in general, but on the blood-forming function and the secretory function of the various glands to which we have just referred.

Thyroid hyperfunction of the extreme type known as Graves' disease, thyroid hypofunction of the extreme type known as myxedema, are associated with anomalies of menstruation. Between the excessive type known as Graves' disease on the one hand and myxedema on the other, there are innumerable gradations from the extreme down to the types which are scarcely recognized. And here again we may have anomalies of menstruation.

Whatever we may find to be the ultimate primary causes of exophthalmic goiter on the one hand and myxedema on the other, the fact remains that thyroid diseases are six to eight times more frequent in the female than in the male. This again proves the element of instability. This is a point to remember, *that of about three thousand cases of Basedow's disease only one hundred and eighty-five developed before sixteen.*

When we consider the nervous and digestive symptoms of exophthalmic goiter and the mental upset associated with this condition, and the metabolic changes and physical and mental lack of tone and energy in myxedema, we perceive that in

these extreme types and in innumerable gradations down to the slightest forms, we may include thousands and thousands of patients suffering from hyperthyroidism, or hypothyroidism with the innumerable variations in the symptoms, *the majority of which have been considered in times past as hysterical or neurasthenic.*

The first truth to be recognized in the study of the Endocrine System is that an upset in any one gland has an effect on the whole cycle, causing overactivity or underactivity of one of more or of all or of many. This introduces all the various changes belonging to hypersecretion and hyposecretion of the other glands, particularly the adrenals, hypophysis, thyroid and ovary. The triangle of thyroid, adrenals and pancreas is well known. The adrenals are intimately associated with the pancreas, the pancreas is intimately associated with digestion, sugar metabolism and the liver function. Hence a thyroid affection, either hypersecretion or hyposecretion, acts through the adrenals on the pancreas itself, and through these three organs there is a change in metabolism and liver function. Besides thyroid stimulates peristalsis and intestinal secretion. Hence the innumerable digestive annoyances associated with hyperthyroidism particularly.

Then we know of the relationship between the hypophysis on the one hand and the thyroid on the other with the well known advantages of giving hypophysis extract in some cases of hyperthyroidism.

The pituitary cannot take the place of the thyroid in animals affected with cachexia thyreopriva, nor is pituitary extract able to take the place of thyroid extract in the treatment of goiter and myxedema. There is no evidence that these two organs act vicariously. The effect of their injection is entirely different, but they do have a certain similarity of function in relation to growth and development (Schafer). So that the variations in the symptoms occurring in hyperthyroidism or in hypothyroidism associated more or less directly with ovarian function, produce a mixture and a confusion of symp-

toms which in many cases take weeks or months of observation to decipher and to definitely correct.

At the climacteric period we are confronted with a supposedly normal waning of the ovarian function associated with which there should be a very gradual progressive diminution of thyroid activity. The relationship between the ovaries and the thyroid and the other glands of internal secretion, at this period, is extremely unstable, which accounts for the numerous annoyances from which women suffer. I refer not only to the flashes or flushes supposed to be typical of the menopause, but to the psychic and nervous manifestations so frequently observed at this period.

We distinguish during the climacterium and the menopause stage three alterations in the activity of the thyroid gland. One a more or less continuous hyperactivity of the thyroid, the second a more or less underactivity of the thyroid, the third such a marked instability of the gland that at times hyperthyroidism is evident and at other times hypothyroidism is evident. Therefore in the first type we have the overexcitable type, in the second we have the depressed type, in the third we have the type alternating between the one and the other, ofttimes suggesting the manic-depressive type of insanity. Here again we have an involvement of the other glands. We may have an overactivity of the anterior lobe of the hypophysis inasmuch as the inhibition by the ovary is removed. Hence the trichosis and the other evidence of anterior lobe overactivity. We may have an alteration often enough in the posterior lobe, a diminution of its activity leading to obesity and a high sugar tolerance.

If we have an overactivity in the anterior or posterior lobe, that accounts for the increased tendency to sugar at these stages, lasting for various periods or even continuous and permanent. Then come the variations in the adrenal function giving us the hypoadrenal type, the low blood pressure type, and the hyperadrenal type, the high blood pressure type so frequently encountered at this period without evidence of kidney involvement. With low pressure hypopituitarism is

to be considered. With high pressure excessive action of the posterior pituitary lobe is suggested.

With hypopituitarism we have the subnormal temperature, slow pulse and low blood pressure, with drowsiness and dullness.

The various alterations in these three or four glands produce innumerable combinations of symptoms and explain the variability of symptoms even in the same patient on various days, weeks and months.

Since thyroidectomy results in growth of the pituitary gland, especially the anterior part, it is probable that this may occur too in hypothyroidism and the myxedematous forms.

The pituitary and the suprarenal are closely related and we know that an injection of adrenalin markedly increases the efficacy of pituitrin and *vice versa.*

The posterior lobe extract stimulates the flow of cerebrospinal fluid. The secretion of the posterior lobe is excited by duodenal extract, if injected into the circulation, which causes its hormones to be thrown out in increased degree into the cerebrospinal fluid.

The pituitary and the suprarenals are associated functionally with the pancreas and the liver. The thyroid is likewise concerned with carbohydrate metabolism and hypothyroidism is associated with increased sugar tolerance.

Since hypothyroidism is often associated with increased activity of the posterior pituitary lobe, the high sugar tolerance of the former may be modified. This combination is responsible for high blood pressure. If both thyroid and posterior lobe are deficient there must be a markedly increased sugar tolerance. If both thyroid secretion and posterior lobe are increased there is an increased tendency to the opposite condition. Hence an altered relation in the secretions of the thyroid, pituitary and adrenals may, owing to their relation to the pancreas and the liver, markedly influence sugar tolerance and thus bear a close connection to diabetes mellitus or diabetes insipidus and to blood pressure. Adiposity due entirely to posterior lobe insufficiency, hence, may not always evidence

polyuria and may even have glycosuria. Earnest claims are made, however, that hypopituitarism is the cause of polyuria and diabetes insipidus (true). In this connection it may be mentioned that in acromegaly in the active stage of oversecretion 30 to 50 per cent. evidence glycosuria. If anterior lobe growth or hyperactivity interferes with activity of the posterior lobe or if hypersecretion of anterior lobe is followed by a state of exhaustion of the gland and the posterior lobe is also diminished in function, then high sugar tolerance eventually follows in acromegaly.

With the hypothyroid type we have the slow pulse, with the hyperthyroid type we have the rapid pulse and various types of tachycardia.

With the adrenal involvement we have the normal blood pressure, the low blood pressure or the high blood pressure. We may have the types that are extremely adipose evidencing here both the thyroid type and the hypophysis type.

With the hypothyroidism we may have a lack of proper stimulation to the metabolic processes, giving us the thin patient, whereas we ordinarily think that a diminished metabolism gives us the stout patient.

In the hyperthyroid type we have the excessive metabolism, giving us in many cases a thin patient unless there is associated with this a hypoactivity of the posterior lobe which then again introduces the phase of obesity and the high sugar tolerance.

So we have to rely for our diagnosis of these cases on their psychic manifestations, their nervous irritability, the pulse-rate, the blood pressure, presence or absence of sugar in the urine and blood, high or low sugar tolerance, trichosis, obesity, tremor, etc.

The administration of the various gland extracts gives us in many cases the key to the situation. The hyperthyroid type is readily recognized by the effect of thyroid. Hyperpituitarism (post.) may be disclosed by a hypodermic of pituitrin. The low-pressure type is readily recognized by the effect of adrenalin, suprarenal and pituitary extract, and in many cases a combination of the three is necessary. Ovarian extract and

ovarian residue for the flushes are in many cases specific in effect. Here again we must not fail to consider the value of other gland extracts or other methods as diet, baths, massage, bromides, hypnotics and the various sedatives.

Just as severe monthly premenstrual symptoms speak for a poorly balanced endocrine system, so a severe menopause experience speaks for the same and a placid climacterium denotes a well balanced interglandular relation.

Like changes of lesser degree between the glands may occur in women at any period and often in the years preceding the climacterium. Unfortunately, in many of these cases menstruation is not affected. If it were, our attention then would be attracted more readily. A slow pulse in a patient always calls my attention to an underaction on the part of the thyroid or to an underaction on the part of the hypophysis. A rapid pulse not even faster than 90 or 100 always calls my attention to a condition of hyperthyroidism or hyperadrenalism.

The excessive irritability of some patients, their nervousness, their instability, should call our attention to anomalies of the secretory apparatus in the thyroid, adrenals or hypophysis. In overactivity of the hypophysis we have the temperamental changes, such as lack of concentration, feeling of distress, indecision and irritability. The opposite is seen in dullness, indecision, lack of energy, tendency to melancholia, poor memory and the blues, pointing to an underactivity on the part of the hypophysis gland.

In early underactivity of the pituitary we have hypotrichosis, little axillary and pubic hair, the sexual apparatus develops poorly or becomes atrophic, the skin is smooth or rough but dry, there are often polyuria and a high sugar tolerance. There may be subnormal temperature and slow pulse. There is also a frequent combination of psychoses, nervous conditions; and even epilepsy has been noted. In many cases of goiter the hypophysis is found affected. Whatever chemical factors cause the hypophysis to become hyperplastic the same factors act upon the thyroid. Almost all the hypophysis cases are eventually deficient even if the condition is hyperplastic

at first. So practically all the typical hypophysis cases of Cushing showed a thyroid deficiency.

Hence I have found it of extreme value to administer ovarian residue and ovarian extract in large doses by mouth and by needle in cases of hyperthyroidism. Pituitary extract and placenta are often of great aid. Corpus luteum may diminish blood pressure if it inhibits the posterior pituitary. I am astonished that in this condition the value of these extracts is not more generally recognized. The value of thyroid in the cases of myxedema and in the ofttimes unrecognized cases of underactivity of the thyroid is so marked that no one can mistake the value of this therapy.

Thyroid extract is of great value too as a diagnostic aid, for not infrequently in certain puzzling cases we get an aggravation of the symptoms, an increased irritability and an increasedly rapid heart, and we know that we are dealing with a sensitive thyroid and not a hyposecretion.

Undoubtedly the greatest difficulty in the proper interpretation of interglandular upset depends upon the fact that so many of them are of minor degree, of a degree less than is typical of the well exemplified cases.

If we have exophthalmic goiter on the one hand and myxedema on the other; gigantism or acromegaly on the one side, certain types of dwarfs or dystrophia adiposogenitalis on the other side; if we have tetany and paralysis agitans on the one hand, and myasthenia gravis on the other; if we have excessive sexual and physical development due to tumors of the pineal, the hypophysis and the adrenals and testis on the one hand and cases of undeveloped genitalia and infantile uterus on the other; if we have acromegaly on the one hand and osteomalacia on the other; if we have excessive function and menstruation through oyster ovaries on the one hand and diminished function and relative amenorrhea through ovarian hypoplasia and degeneratio-adiposo-genitalis on the other; if we have the extreme adrenal disease known as Addison's disease; *why may we not expect minor degrees of involvement in the glands or pluriglands responsible for these major cases,*

the resulting symptoms here often lacking the typical earmarks which define the standard types of which we have made mention?

If instability of gland function is transmitted we have a new basis for predicating the various types of abnormality which may be inherited. Inherited instability of the thyroid may lead in the progeny to either myxedema or to exophthalmic goiter or to variations between these extremes. Inherited instability of the hypophysis may lead to small stature or to large growth, or to simply the psychic manifestations of dyspituitarism. *So that one member of a family may inherit from his parents or grandparents these somatic changes due to gland anomalies or one may inherit the nervous tendencies or the instability of the nervous system or psychoses resulting from anomalies of the internal gland secretions.*

A transmitted instability of internal gland secretion may not manifest itself until some exciting cause appears, and if no exciting causes eventuate the condition may not be recognized as an instability. Certain individuals are more susceptible to involvements produced by any of the inflammatory or infectious diseases. Status thymicus may give no warning until anesthesia or drowning bring the concealed condition to the surface. Pregnancy and labor may be the first factors to bring out the lack of resistance of asthenia universalis.

We must distinguish between the somatic and the mental or psychic side of pathological states due to the endocrine relation. I have seen in so many of my patients attacks of mental depression and blues, so many cases of excitement and states of exaltation of minor degree, so many cases where the states vary from slight exaltation to slight depression without apparent cause, cases after labor with depression of a mild melancholic type, that long ago I came to the conclusion that we must grant variations in intensity in mental diseases.

If we have the forms known as manic-depressive insanity, dementia precox, melancholia, etc., why may we not have minor types of the same conditions confronting us in our gynecological and obstetric work? We know the excitability asso-

ciated with the various grades of hyperthyroidism, we know the mental apathy associated with the various degrees of myxedema; we know the mental peculiarities and the changes in character in patients with hypophysis alterations. *All these variations noted from time to time in my experience have convinced me that mental diseases of extreme type may have the same relaton to the milder forms and to the so-called neuroses and psychoses, and to the so-called neurasthenia and hysteria, that the major forms of exophthalmic goiter and myxedema, gigantism and dwarfism, etc., bear to minor variations noted every day in our experience.*

We note in epidemics varying degrees of virulence in successive ravages. We have all degrees of eclampsia and toxemia of pregnancy, those who die in spite of all treatment and the forms which recover practically without treatment. We have variations in intellectual ability from the brightest to the average down to the mental deficients and the mental defectives. The recognition of the moron of the various grades is in itself a fascinating study.

Action of the endocrine glands of an unusual nature may manifest itself entirely in body and physical changes. In another class there may be body changes and psychic or mental alterations combined. In a large class, however, the alterations are psychic, the physical changes being of such a minute degree that they give no clue to the involvement of the glands. Here in all probability a marked pluriglandular upset is at fault. It is the absence of physical changes in this class of mental diseases that has probably made it so difficult for physicians and the leading neurologists to eventually come to conclusion that the ductless glands are responsible for these conditions. I had the pleasure of seeing recently a case of muscular dystrophy in a boy of fifteen. A first glance was sufficient to show me the acromegalic condition. The head was huge, the forehead large, the chin prominent, out of all proportion to the body size and age of the boy.

Since in other cases of this disease the somatic changes may be diminished or absent, we may fail for that reason to

consider the endocrine glands as responsible. Why in one family or in one individual the body is changed, in another the mind and psyche, in another both, is hard to tell. That is a problem for the future. Even in other diseases the same problem holds. Syphilis may affect the bones, the skin, the testes or the nervous system. It is an old observation that if syphilis in the tertiary stage affects the bones or the testes or skin, for instance, the nervous system is rarely involved. On the other hand, paresis or locomotor ataxia occur in individuals in whom there are no other somatic evidences and in whom the primary lesion was not followed by marked skin lesions. There must be in some individuals a marked protective influence over the cerebrospinal structures and it is perfectly possible that *among other glands hypophysis may be one of these protective glands.*

I may say that we must come to the conclusion eventually that all the physical and mental states depending upon endocrine pathology will be found to have innumerable variations from the forms known as types, to the slightest degrees of variations, including those forms considered as neurasthenia and hysteria, in the vast majority of cases erroneously so. It is these observations repeated time and again in my experience which have made me so hostile to the diagnosis of reflex in gynecology. Those innumerable states of body and mental function formerly considered to be caused through reflex channels by cervical erosions, lacerations of the cervix, deviations in the position of the uterus, prolapse of the ovaries, etc., all these have for years been treated by me on the basis of endocrine pathology and justly so and most successfully. Most of us recall the furor of operation for movable kidney for the purpose of curing by this step innumerable physical and psychic symptoms. Today this procedure for this purpose is practically a memory.

In bringing out the latest weakness due to hereditary transmission or congenital weakness, the accidents of life also come into play in their effects upon the internal glands. Every infection must play a part, the diseases of childhood, typhoid

fever, pneumonia, tonsilitis, influenza, pelvic infections play their part in exerting deleterious influence on the protective glands of the body, among which the glands of internal secretion are the most important. Mental states must be likewise taken into consideration. We know the action of fear and anger on the thyroid, adrenals and the vegetative nervous system. Long-continued grief, disappointment, abnormal sexual practices, unhappiness, excessive mental exertion, shock have a direct or indirect influence on the internal secretory glands. Onanism, coitus interruptus, sexual longings, etc., must not be given a minor place in this etiology.

Who knows but that circulatory disturbances or the action of as yet uncharted cerebral areas act upon the glands of internal secretion and are acted upon by them and the hormones, of which there are probably many more in every gland than we now realize. It is in the hope that the severer forms of endocrine upset may yield to new methods that I make the observations which now follow.

Cerebral activity as such is not only influenced by the secretory glands but probably exerts an influence on them. Tumors, even if not connected with the hypophysis, and varying degrees of hydrocephalus, influence the secretory activity of the hypophysis gland . The posterior lobe is connected with the cerebrospinal fluid. *It seems inconceivable that this gland should have been placed in this position, its relation to the cerebral structures so close, without its having a marked nutritional and protective value on these structures.* Hence we shall understand some day more than today, the relation of secretory anomalies of this gland to cerebrospinal conditions, pressures and the psychic states.

It is possible that the cerebral cortex or that the nervous system is attacked in those individuals in whom there is a lack of protective power on the part of the pars nervosa for instance over the cerebrospinal structures. Who knows but that the hypophysis secretion may have an important action in this respect. A lack of it may predispose to involvement of the cerebrospinal organs. We have in chorea a cortical condition which is often

produced by what is known as a rheumatic infection, not infrequently associated subsequently with endocarditis. We may take it for granted that this rheumatic infection affects one or more of the ductless glands, parathyroid or hypophysis for instance, producing the symptoms of chorea associated with which, of course, may be an involvement of the circulatory structures by the infection itself only if the patient have an endocarditis.

Let us call to mind the work of Goodman in treating cases of chorea. Here a certain amount of blood is taken from the child, the blood is centrifuged and this serum is injected into the spinal canal after the same amount has been removed by spinal puncture. In one-half of these cases the patients lost their chorea in a few days, of the remainder more than half lost it after a second or third injection.

Goodman finds that only a small percentage of children with chorea have endocarditis. He estimates it in his experience to be 7 to 10 per cent. Others estimate it as high as 20 to 25 per cent., this possibly holding for the acute cases or the severe cases which come into hospital service.

Personally, I have considered the connection between the infection (rheumatic or otherwise) and chorea perhaps to exist through the medium of the endocrine glands. It is possible that in some cases an infectious agent involves some of the glands, for instance the hypophysis or more particularly the parathyroids. Parathyroid has been used in chorea, tetany, epilepsy and eclampsia. In Goodman's experience if a serum derived from the blood of one choreic patient is injected into the spinal canal of another patient, no effect is observed. A cure and benefit are obtained only if the autoserum is used. This speaks against an infection as the total factor in chorea, even in these so-called rheumatic forms. If the parathyroid is one of the glands involved in chorea and if other glands are also concerned in the condition we might then readily understand why the autoserum only of the patient acts when injected into the spinal canal. In other words, with endocrine pathology only the serum of the patient himself, whatever the nature of

the upset may be, should act as an antibody when injected into the cerebrospinal canal.

According to Gley the cells of the choroid plexus are granular cells, the activity of which regulates the composition of the cerebrospinal fluid contained in the cerebral ventricles and in the central canal of the spinal cord. The cerebrospinal fluid thus formed returns to the blood by the perivascular sheaths, the lymphatic paths and the blood-vessels of the dura mater. Thus it might be said that "the choroid plexuses are glands of external secretion but having an internal destiny." This calls to mind the possibility of endocrine hormonic changes which may affect the cells of the choroid plexus or the return paths and may thus account for the entrance of fluid and toxic substances and for their inability to be excreted.

On reading Dercum's observations concerning dementia precox the thought occurred to me that possibly the same method of treatment might be advisable here, namely to withdraw blood from the system and inject a serum into the cerebrospinal canal after removal of a certain amount of the fluid. Dercum states that while no treatment of this sort to his knowledge has been attempted, he has noticed that the withdrawal of cerebrospinal fluid had improved some of these cases notably. In all mental diseases in which the cortex is involved, or cortical centers, it may be found that this line of treatment might be of value on the theory that, while in the blood toxins and antitoxins are produced, the toxins only have an effect on the cerebrospinal structures, the antitoxins not finding entrance thereto or not in sufficient power. On the other hand, it may be that the antitoxins are insufficient or not formed at all within the cerebrospinal canal. Spinal puncture removes these toxic products and if antitoxins are produced in the general system as one would expect, if the ductless glands are concerned with the production of antitoxins, then injection of the same into the cerebrospinal canal would produce a beneficial result. It may be that in normal individuals toxins and antitoxins enter and leave the cerebrospinal canal and that when this mechanism of exchange is affected, whereby

toxins enter and cannot be excreted, and when the antitoxins in the blood cannot enter or are introduced in insufficient quantity, that we then have the resulting mental and psychic alterations which may perhaps be cured by spinal puncture and its replacement by the antibodies in the autoserum.

Every man interested in any particular specialty may at any time fix his attention on any one gland of the body. To begin the study of any one gland, one must study the relation of the other glands to it, in the trophic sense or in the inhibitory sense. We must study the value of any one gland diagrammatically so to speak. We must put above it, in a stream of thought or on paper, those glands which inhibit it; we must put under it in a stream of thought or on paper those glands which support it.

When that one gland in which we are interested shows anomalies, we must look and see what glands are failing in their support and which glands are overacting or underacting in a secretory way. This leads us into a maze of combinations which require much study in many individual cases to unravel and to help. It is needless to say that many of these gland anomalies can be helped only by surgical means. Graves' disease is the finest example. The beneficial effects of operation on exophthalmic goiter are well known. Cushing has shown us the value of operations on the hypophysis gland, where pressure symptoms are the important thing. Hyperovarianism with persistent menorrhagia is another. I have cured several cases of persistent menorrhagia and metrorrhagia by resection of part of each ovary. Some cases of sterility come into the surgical class by resection of half of each ovary in those cases of sterility when menstruation is normal or excessive and yet ovulation seems not to take place. Osteomalacia is another condition corrected in the majority of instances by surgical means.

I have attempted to review the elements of the internal secretory glands in gynecology from the broader standpoint of the physician. Our concern is to understand the underactivity of certain glands and to support them by administering to the

patient substances which are insufficient, and by attempting to inhibit those glands whose functions for the moment are hyper. Do not think because I have praised so much the value of ovarian extract, ovarian residue and corpus luteum that I think the ovarian function dominates the whole cycle. Practically speaking, the thyroid and ovarian and hypophysis extracts have proved their very great value in gyneocology. It is simply because faulty ovarian function shows us that there is an upset in the cycle that we lay so much stress on the ovaries and the restoration of proper secretory activity, hoping thereby to aid in restoring a normal balance when pluriglandular complications are in evidence. Eventually we shall find and differentiate the numerous hormones in every gland in the endocrine system. We shall find that many of them have a somewhat similar relation to physical and mental growth, but we shall eventually discover the selective action of the various hormones.

I have no doubt that just as in poliomyelitis, chorea and syphilis certain areas are affected by selection by bacteria and the toxic products of the infection, so the various hormones both in health and disease manifest the selective influence of the endocrine glands. That innumerable variations must result dependent on interglandular relations and the congenital physical and mental characteristics of the individual is a rational conclusion.

Let me conclude with the opening paragraph:

If we can fathom and understand what the ductless glands have done to an individual up to the stage of puberty, we may appreciate why the individual develops as he does. If we can reason out what those ductless glands have done to that individual from puberty on, we may understand why that individual is what he is and why so many changes have occurred in him. If we can eventually fathom what hereditary and accidental and intercurrent factors are responsible for these gland changes and for the consequent somatic, mental and psychic factors, *then medicine will have accomplished a glorious work.*

CHAPTER IV

INTERNAL SECRETIONS

Pineal Gland

Total destruction of the pineal gland by malignant tumor results in profound cachexia with trophic derangement. Pineal tumor results in obesity but not genital atrophy. Pineal obesity is probably due to hyperfunction, but this is not certain, because obesity is observed in pineal disease where there is certainly a reduction of secretion. Pineal tumor, generally teratoma in boys of under seven years, produces abnormal growth in height, abnormal growth of hair, premature development of the genitalia and of sexual instinct, and mental precocity. In these cases the changes were associated with a diminution of the pineal tissue. During the period of the complete development of the pineal gland—that is, until the seventh year—this organ normally exerts an inhibitory influence upon the development of the sexual glands, and probably has a secondary effect on mental development. Destruction of the pineal gland at this stage leads to physical precocity. There is an antagonism between pineal gland and hypophysis, for pituitary insufficiency causes hypogenitalism. It appears that in adult animals the pineal gland is of lesser consequence.

The pineal gland shows its chief functional activity in childhood; a significant involution of the structure occurs at puberty. Pineal enlargement, whether associated with hyperplasia or hypoplasia, may produce a tendency toward adiposity. Certain types of pineal tumor are characterized by extraordinary precocious puberty. According to Frankl-Hochwart, "when in a young individual (boy) there is increase in stature and unaccustomed growth of hair, obesity, drowsiness, a premature genital and sexual development, with evidence of precocity of adolescence, pineal tumor must be thought of."

Thymus

When the thymus is removed in dogs they die in a year. After a fourteen-day period of latency, they become for the

next two or three months of a spongy appearance, are easily tired, have a peculiar walk, show apathy, a diminished intelligence, and a most unusual hunger (stadium adipositatis). This passes over into the terminal cachectic stage, which lasts three to six months. In spite of their hunger they are more unsteady, show attacks of muscular tremor, lose their hair, and become gradually idiotic. Finally, they die in a comatose stage. Through removal of the spleen the cachexia comes on more quickly. Klose says that the symptoms after removal of the thymus are due to a poisoning by phosphorus. If the thymus is removed in the early weeks of a dog's life there are decided changes in the bone through diminished calcification. They grow more slowly, have weakness of the muscles, become easily tired; fractures heal slowly, the extremities are bent, and there is an increased loss of calcium.

The thymus begins to regress at puberty. This alone points toward the connection of the thymus with the genitalia. Individuals with hypoplastic ovaries retain the thymus longer than normal. In this form of status thymicus there is a question whether the thymus is in direct relation with the genitalia or whether both are not a symptom of a slow development. Castration, after puberty has begun, causes an increase in size of the thymus. According to Hammar, the hyperplasia of the thymus after castration is not compensatory, but Hammar believes that the ovaries and adrenals are thymus depressors, while the thyroid (and possibly hypophysis and parathyroids) are exciters of the thymus.

Blundel considers chlorosis an auto-intoxication by products of metabolism, which in childhood are destroyed by the thymus and in the later years by the ovaries. If the thymus stops its action at a too early age, and the ovary begins its work too late, then in the interval the organism is poisoned. Blundel has had excellent results with preparations of thymus. Novak is skeptical about this theory. Status thymicus (sudden death) is often associated with a large thymus, and formerly this sudden death was attributed to thymic asthma, but in sudden death in status lymphaticus there is no narrowing or

closure of the trachea. The condition is really due to primary heart-failure. In these cases there is a general enlargement of the lymph glands, of the tonsils, of the follicles at the base of the tongue and in the intestines, enlargement of the spleen, large thymus, narrow aorta, large, soft, pale heart. These patients stand narcosis poorly and have a deficient development of the "chromaffin system." It becomes easily tired, this important system does, at least in cases of sudden death. Death occurs by sudden exitus in individuals who have the not infrequent combination of Basedow's disease and status thymicus. Individuals with a lymphatic-chlorotic constitution show a remarkably slight resistance toward infectious diseases. The diagnosis in certain cases concerns individuals with a pasty look, enlarged glands of the neck, hyperplasia of the tonsils, hypertrophy of the left ventricle, enlarged spleen, and a tendency to eczema. In collapse the only treatment consists of intracardial injection of adrenalin. This is the ideal treatment for producing heart excitation and also in eventual collapse of the chromaffin system. (Biedl.)

After a short period of development, until about the second year of life, retrogressive changes occur in the thymus. Involution coincides normally with adolescence. There may, however, be the so-called persistent thymus. Removal of the sex glands of rabbits is followed by hypertrophy of the thymus. If thymectomy is performed on guinea-pigs before puberty there results a rapid development of the ovaries. The thymus probably exercises an inhibitory influence upon the development of the ovaries, and involution of the thymus is consequent upon the maturity of the sexual glands. In thymectomized animals the long bones take longer to develop, calcification progresses slowly, and this causes retardation of growth, softness of bones, and imperfect apposition of the periosteal bony layers after fracture.

"The thymus gland is an organ of importance. Extirpation at the height of its development results finally in death. Most probably its most important function consists in binding acids, thus removing injurious substances from the

blood. This supposed function gives us an explanation for the disturbances occurring in the calcium metabolism after extirpation of the organ, for the changes in bone and in the central nervous system. The thymus gland occupies a dominating position over the lymphatic apparatus. Between the thymus, on the one hand, and the organs of internal secretion on the other, complex relations exist. This is especially true of the spleen. This organ is, so to speak, 'prepared' by the thymus to take up some of the latter organs' still unexplained functions after involution" (Lampe).

There seems to be a close relationship between the thymus and thyroid. The symptoms of exophthalmic goiter are due to either an excess or perverted secretion of the thyroid. The primary disturbance exists in the thymus, the action of the thyroid being that of a "multiplicator," according to the theory of von Mikulicz. According to the theory of Hart, Basedow's disease is to be attributed rather to hyperthymisation than to hyperthyroidism.

Parathyroids

Removing the parathyroids produces tetany. Experiments on pregnant dogs show that removal of the parathyroids causes tetany. The important symptoms consist of attacks of tonic, painful contractions or cramps, especially in the extremities. Associated changes are trophic disturbances, especially changes in ectodermal structures, such as loss of the hair, brittleness of the nails, the formation of cataract, anomalies of the teeth, looseness of teeth.

The parathyroids in pregnancy show hyperemia and evidences of increased activity. Tetany in the pregnant, parturient and nursing woman does occur. Cases of maternity tetany are characterized by the severity of the attacks, the spreading of the attacks to many groups of muscles, and the very intense pain. The attacks do not last long. Neumann was the first who showed that the attacks may be started by uterine contractions. Attacks may occur during curettage, whether the patient be pregnant or not; that is during simple curettage or

curettage for miscarriage. It may be stated that in all those cases of tetany which occurs in pregnancy there are changes in the parathyroids, the cause of which dates back a long time, Since in many cases evidences of the failure of parathyroid secretion first become manifest during pregnancy, it is probable that pregnancy makes increased demands on these structures. What is known as regards the etiology may be summed up in the observation that certain classes, such as tailors and shoemakers, are especially liable.

Tetany of the pregnant woman exerts an unfavorable influence on the fetus. As a general rule, gravidity tetany is a severe illness. In severe cases of tetany in pregnancy the condition should be interrupted. Tetany has a tendency to recur, and Frankl-Hochwart believes that future pregnancy should be prohibited.

The parathyroids have been said to stand in relation to eclampsia and osteomalacia. The clinical picture of eclampsia is so absolutely different from that of tetany that only an associated etiologic connection seems possible. On the other hand, it is possible that the parathyroids stand in relation to osteomalacia. Just in what way these bodies act upon the calcium metabolism is not known, but their influence upon the calcium deposits in bone and teeth is not to be denied. It must be recalled that attacks of tetany may be followed by loss of hair and the nails. (In the course of the tetanic attacks ergotin and chloroform should not be used.) Erdheim found in six cases of osteomalacia evidences of a former hyperfunction of these glands. He does not consider the changes in the parathyroids to be the cause, but only a symptom of osteomalacia. In unison with this opinion may be cited the cases where osteomalacia and tetany occur at the same time (Joseph Novak).

Partial removal of the parathyroids in carnivoræ always shows more or less severe symptoms of tetany which later disappear. If, after partial removal of the parathyroids, no symptoms appear, the animal is in the condition known as *latent tetany*. Such animals as appear sound after removal of two

or three parathyroids are attacked by tetany when they become pregnant, or if injected with placental extract. In other words, a metabolic derangement causes the symptoms of tetany to appear where they were previously latent. Every acute tetany is accompanied, in addition to the nervous symptoms, by secondary signs, such as shaggy appearance of the coat, falling of the hair, eczema, and extreme emaciation.

The acute nervous symptoms coming on after removal of the thyroid occur only where the parathyroids are also removed. This condition, known as tetany (characteristic muscular convulsions), is due to suppression of the function of the parathyroid, and is called tetania parathyropriva. Milder forms exist and also a latent tetany characterized by hypersensibility of the nerves, a state occurring frequently after partial removal of the parathyroids.

Cases of thyroidectomy in the human being occasionally have latent tetany, because, when pregnant, tetany develops. There is another form, known as maternity tetany. Tetany is also seen in infants. There is an intimate relationship between tetany and menstruation, pregnancy and lactation. Partial removal of the parathyroids in animals, as stated above, may be followed by a tetany provoked by pregnancy or lactation. The teeth of people who have had infantile tetany show hypoplasia of the enamel. The parathyroids frequently become tuberculous, and the Chvostek phenomenon in tuberculosis patients is frequent. *Myasthenia gravis* comes from increased function of the parathyroids. (?) *Paralysis agitans* comes from too little parathyroids. (?) These glands are supposed to maintain the balance of neuromuscular activity. Myasthenia and tetany are diametrically opposed, according to Chvostek. Tetany is produced by hypofunction, while myasthenia is produced by hyperfunction.

The extract of parathyroid glands increases intestinal peristalsis and the muscular contractions of the uterus and increases diuresis. According to Kocher, the energetic use of thyroid extract and of iodothyrin in large doses abates the symptoms of postoperative tetany, and when continued stops

the attacks. In postoperative tetany the improvement is immediate after hypodermic injection of soluble thyroid extract. It is not probable that enough parathyroid substance is present in the extract of the thyroid glands to account for this effect. There are numerous accounts of the favorable effects of thyroid gland extracts in the parathyroid tetany of animals.

There is a relationship between the thyroid and the parathyroid. After removing the parathyroids, the thyroid often hypertrophies. Thyroid treatment acts well in parathyroid tetany. There is a parathyroid hypertrophy after removal of the thyroid. These three facts speak for a relationship. The hypertrophy of one group, after removal of the other, may be regarded as compensatory. Possibly a vicarious activity of the thyroid and parathyroids may be assumed. Rudinger believes the thyroid and parathyroid to be antagonistic. He believes that the function of one gland is controlled by the other, and that when this balance is disturbed by the removal of one the other one hypertrophies. The giving of parathyroid glands was followed by bad symptoms in myxedema, but good symptoms resulted in Graves' disease. Rudinger believes that the hyperfunction of the thyroid in Graves' disease is restrained by giving *parathyroid glands,* while in myxedema, the hypofunction is intensified. He believes that the thyroid secretion stimulates the sympathetic nerves. Removing the parathyroids, which are the inhibitory agent, increases the sensibility of the sympathetic nerves. The most important point in favor of the theory of antagonism is provided by the hypertrophy of one gland when the other is removed. Parathyroid tetany may be due to a toxic product of metabolism or to the presence of a toxin. In tetany of children there is a scarcity of calcium in the organism of children. MacCallum found that the giving of a five per cent. solution of calcium acetate and calcium lactate by mouth, or hypodermically, or intravenous, to dogs from which the parathyroids had been removed, stopped the tetanic symptoms for twenty-four hours. The parathyroid glands possibly control the calcium metabolism. Calcium salts

exercise an inhibitory effect upon pathologic muscular convulsions (Biedl).

The parathyroids have much to do with the absorption and excretion of the mineral salts of the body, and are important, therefore, to the nervous system and the bone. Interference with their function causes a decreased resistance to infections. If the parathyroids are injured, lactate of calcium and the feeding of parathyroid, or transplantation of parathyroid, are necessary. One-sixth of all the thyroid cells are sufficient for body needs, and one normal parathyroid, instead of the four, suffices.

Thyroid

The secretion of the thyroid gland is an iodized albuminoid which modifies the activity of distant organs (hormone). By increasing normal function it affects the metabolic processes, cardiac activity, some portions of the sympathetic system, the hypophysis, the suprarenals. Instances of its activity are the promotion of skeletal growth, the development of the sex glands. It also inhibits function. The limitation of the internal secretory function of the pancreas is an evidence of its inhibitory power.

The arrest of growth in removal of the thyroid in animals is due to a retardation of the process of ossification, both of the epiphyses and of the synchondroses. In the internal organs there results an enlargement of the glandular portion of the hypophysis. In addition to the difference in skeletal growth, there is general apathy and atheromatous degeneration of the aorta. There is infantilism, imperfect activity of the sex glands, and general torpor. The animals weigh one-third as much only as they should. The arrest in the growth of the skeleton and the development of the sex organs is the typical and invariable result of the absence of the thyroid function in carnivoræ and herbivoræ. In older animals the changes are less marked, removal causing loss of appetite, sluggish digestion, increased emaciation, and finally cachexia thyreopriva. There is apathy, trophic disturbances of the

cuticle, falling of the hair, dryness of the skin, and eczema. The number of red blood-cells and the hemoglobin are decreased, but there is an increasing leukocytosis. The typical and invariable result of the suppression of the thyroid function in adult animals is a progressive emaciation, which increases to profound cachexia and culminates in death. The most characteristic post-mortem finding is the enlargement of the hypophysis (Biedl).

The same changes occur in human beings after removal of the entire thyroid. This is the so-called *cachexia-strumipriva*. A further symptom of this cachexia is a diminution of the mental energy, of the energy for work, and a typical edematous swelling of the skin.

Lack of secretion of the thyroid in infancy produces failure of growth and development, both mental and physical. The thyroid is a necessary element in promoting growth in childhood and in controlling the development of the body and mind. It rouses mental activity and is a cerebral stimulant. It aids nitrogen metabolism. It is essential in its relation to other secretions in providing genital development.

In *congenital myxedema* there is a decided inhibition of growth. There is obstinate obstipation, psychic disturbances, and a marked inhibiting effect on the sex organs. In congenital absence of the thyroid and in the infantile cases of atrophy of the thyroid, which atrophy develops in the fifth and sixth years, the large majority of the cases are found in female children.

In *cretinism* the genitalia remain of the infantile type. The secondary sex characteristics, such as the breasts and the hairing of the mons veneris, are very slightly developed. Myxedema in adults is more frequent than infantile myxedema. Myxedema, cretinism, cachexia strumipriva are all allied conditions.

The thyroid gland is very active at puberty, and begins to regress at the so-called climacteric period. In old age the thyroid becomes atrophic. The falling of the hair, the dropping of the teeth, and dry and wrinkled skin, the lowered

temperature, diminished perspiration, indolent indigestion, and consequent emaciation, reduced metabolism, and consequent deposit of fat, followed by emaciation, decrease of mental power, and the diminution of the activity of the entire nervous system, these are all symptoms which characterize *chronic myxedema.*

Too little thyroid is responsible for some cases of slow growth in children, for eczema, some cases of asthma, perhaps amenorrhea, disturbances of digestion, states of depression and of melancholia, myxedema, etc. also the dry eczema, and itching of the menopause and of old age.

A frequent type of hypothyroidism is that associated with weight. There are scanty or absent menstruations, deposit of fat, drowsiness, slow pulse, dry skin, puffiness of the body, puffiness under the eyes, the type that I have called phlegmatic.

Under the title of "Chronic Benign Hypothyroidism" is grouped a combination of symptoms, such as loss of hair, diminution of the perspiration, changes in the skin, metrorrhagia. Other cases show backache, especially in the morning, without evident changes in the genital organs, and also metrorrhagia. Kocher lays stress on this backache as due to hypothyroidism.

Many cases of hypothyroidism are psychopathic, and, as the thyroid is influenced by mental stimulation and mental depression, mental treatment is of value.

Hyposecretion of the thyroid may cause mental depression, from simple apathy to real melancholia.

Physically there is a dryness of the skin and hair, the skin does not perspire. It becomes pigmented, the hair falls out or becomes gray. The surface of the body is cold, the hands and feet are always cold. Appetite and digestion are impaired. There is an interference with the calcium metabolism. There is a progressive gain in weight. There may be constant pain in the muscles and bones. (Levi of Paris says that in many cases of "chronic rheumatism" thyroid treatment is the best.) When nervous or "neurasthenic patients" complain of such symptoms, one grain of thyroid twice a day added to the other treatment is of value. In ten days the effect should be

evident in less dryness of the skin, in relief from the sensation of cold, and in the decided improvement of mental activity.

In *hyperthyroidism* we have a transient or continuous oversecretion. If this occurs, and the body cannot neutralize or destroy it, then toxic annoyances of various degrees occur.

Congestive goiter shows an overfilling of the blood-vessels and occurs during menstruation or pregnancy, because of the intimate relation which exists between the thryoid and the ovaries. Retained secretion means simple goiter. A hyperplasia and an increase of cells in the parenchyma mean overactivity.

There is a close relation between the ovaries, uterus, and thyroid, hence the goiter of adolescence and of pregnancy. In the climacterium this relation causes changes in the thyroid from hyperthyroidism to hypothyroidism.

The relation of the thyroid to the ovary sensitizes the thyroid gland. This, coupled with the various changes in balance which occur at puberty, menstruation, etc., is responsible for the instability which produces those various nerve phenomena due to hypersecretion or hyposecretion, or variations between the two, which make women the weaker sex.

The comparative frequency with which Graves' disease occurs in persons with status thymicolymphaticus is probably something more than coincidence. On the one hand, therefore, hyperthyroidism leaves, as in Graves' disease, changes in the functions of the ovaries. On the other, primary changes in activity of the sex glands may exercise a secondary influence upon the thyroid, and as a result symptoms resembling those of Graves' disease are produced.

Symptoms resembling those of Graves' disease may be associated with various conditions, as chlorosis, pseudochlorosis (swelling of the thyroid, increased cardiac activity, mental excitement, fatigue, pallor, without chlorotic changes in the blood). Symptoms resembling Graves' disease are often seen at the climacterium. *The remarkable incidence of Graves' disease in women, and the frequency with which its occurrence is*

associated with functional change of the sex glands, are factors of significance.

There may be *paroxysmal attacks* of hyperthyroidism resembling very mild attacks of parathyroid tetany. Attacks may be associated with weakness, dizziness, blueness, very rapid and feeble pulse, and symptoms resembling collapse. Patients appear very sick. There may be associated diarrhea and uncontrolled movements of the hands and extremities. These attacks may come on during nursing, or after fatigue or irritations of various sorts. Such patients, aside from these attacks, have a marked tendency to premenstrual annoyances of the type resembling hyperthyroid symptoms.

Hyperthyroidism is either an excess of thyroid or a dysthyroidism, and this question is not settled yet. In most cases there are evidences of hyperplasia in the gland, yet the condition may be one of perverted function rather than oversecretion.

In all cases of hyperthyroidism the pulse-rate and the heart action are practically increased. I scarcely ever make such a diagnosis without it. I usually rely on a slow pulse for the diagnosis of hypothyroidism.

The vasomotor changes of hyperthyroidism produce a sense of warmth which is relieved subjectively in cold weather. On the other hand, a marked sensitiveness to cold speaks for hypothyroidism.

Tremor is usually present in hyperthyroidism. Exophthalmos is not due to the hyperthyroidism, but probably to the irritation of the hypophysis often associated with the thyroid affection. In Basedow's disease there is generally an increase of mononuclear cells. Berry states that exophthalmos is due to accumulation of fat in the orbit.

The relationship between Basedow's disease and the female sexual sphere is indicated by the frequency with which this disease develops during the sexually active years. Amenorrhea is considered a frequent, even if not constant, symptom of the disease. The ability to conceive is decidedly

diminished. The disease is, as a rule, unfavorably influenced by pregnancy.

The thyroid undersecretes in many cases at first, producing perhaps physical weakness, tendency to fatigue, diminished sweating, loss of hair. It is possible that such evidences of diminished thyroid function, asociated in some cases with muscular and joint pains, may precede or end in or complicate a change from hypofunction to hyperfunction. Involvement of the thyroid may be due to tuberculosis, tonsilitis, influenza, typhoid, lues, staphylococcus infections, etc. In other words, a lesion produced in the thyroid and resulting in lowered energy of the gland in part, leads to an attempt at compensation, and results in symptoms quite different from the early ones of depression. This view of hypothyroidism, associated with the early stages of hyperthyroidism, may account for the improvement obtained by thyroid treatment or by the use of iodin in cases of apparent hyperthyroidism (Dock).

Simple goiter may develop into Basedow's disease through the use of iodids or iodothyrin, through the influence of puberty, pregnancy, menopause, and other strains. Basedow's may degenerate into true myxedema. Sometimes symptoms of Basedow's disease and of myxedema may exist together. This means that the greater part of the gland is inactive, and that what remains active secretes an abnormal product, producing intoxication.

Basedow's disease seems to have a tendency to be transmitted, and in families of such patients there is a tendency to neuroses, psychoses, and diabetes.

Thyroidectomy in animals does not produce glycosuria. Adrenalin injections, which in normal animals provoke extreme glycosuria together with an increased metabolism of albumin in the fasting state, do not produce glycosuria in thyroidectomized animals, even when sugar is given at the same time. Adrenalin produces in dogs, from which both thyroid and parathyroid have been removed, a marked glycosuria, more so than in normal animals. The effect upon metabolism of the suppression of parathyroid function is the reverse of that

produced by the suppression of the thyroid, for, in true athyreosis, the assimilation of sugar is increased and the use of adrenalin is not followed by glycosuria.

The relationship between the thyroid and the metabolism of the carbohydrates suggests that this relation depends upon the pancreas. The thyroid is believed to promote the activity of the chromaffine (adrenal) system and to inhibit that of the pancreas. The direct results of thyroidectomy consist in reduction of the metabolism of albumin, fat, and salt. The indirect results include a hyperactivity of the pancreas, due to the removal of the inhibitory agent. The thyroid, the chromaffine system, and the infundibular portion of the hypophysis accelerate the process of metabolism. The pancreas and the parathyroids retard metabolism. There is a normal balance between the two, as a rule.

If thyroid extract or iodothyrin are given continuously for two or three weeks, the amount of CO_2 excretion will be increased 20 per cent. Thyroid extract has the effect of increasing the capacity for nervous reaction and giving greater energy to phlegmatic people. It reduces constitutional obesity, but not obesity due to overfeeding (Biedl).

The flooding of the organism with thyroid substances exercises an elective stimulating effect upon the sympathetic, and it also influences the activity of those other internal secretory organs which have functional interrelationship with the thyroid (thymus, hypophysis, suprarenals, ovaries.) Amenorrhea is sometimes benefited by thyroid, especially if there are other symptoms of insufficient thyroid secretion, such as weight and dryness of the skin. Administration of thyroid is supposed to stimulate bleeding by causing a dilatation of the bloodvessels, especially in the uterus and nose (Osborne), yet, on the other hand, the giving of thyroid diminishes the bleeding, especially in hemophilia.

It is said by some that insufficiency of the thyroid may cause hemorrhage, and, on the other hand, it is claimed that too much of its secretion may also cause hemorrhage. Too much

thyroid increases the coagulation time of the blood. Too little thyroid diminishes the coagulation time of the blood.

We should not forget that cases which simulate Bright's disease may be simply cases which need thyroid.

Hypophysis—Pituitary

It appears from modern investigations that the hypophysis plays a part in the human economy, from childhood up, which is of great importance in the way of *skeletal growth, mental development, genital development, sugar tolerance, etc.* It produces, by its over-secretion, or under-secretion, most permanent and lasting changes in the bony structure of the body, in the laying up of fat, and influences to a decided degree the mental and nervous make-up of the individual.

The hypophysis is composed of an anterior and posterior part. The anterior seems to be concerned with processes of growth, the posterior seems to be concerned with metabolism, especially with that of sugar. If, in the growing child, the hypophysis fails to perform its functions, there is a failure in bone stimulation and tissue growth, there is a failure in bony development, and the individual may become a dwarf. If the anterior lobe of the hypophysis functionates and secretes too actively during the years of growth, the skeleton becomes larger than normal, and if the process continues in the pre-adolescent stages, the individual becomes a giant. It can be readily seen that this tendency to become a giant exists so long as complete ossification of the epiphyses has not taken place. After the individual has attained his full growth in a normal manner, and after ossification of the epiphyses has occurred, overactivity of the anterior lobe stimulates bone growth, but not in the way of general increase in stature, for that is now no longer possible. It, however, produces changes in the bones of the face and hands and feet, producing the condition known as acromegaly. So much for the anterior lobe.

The posterior lobe is concerned with the metabolism of sugar. If there is failure of function on the part of this lobe, there is a tendency to gain in weight, and at any period of life

adiposity may result. In the young growing child there is then a diffuse accumulation of fat over the entire body. If in the adult the same change occurs, the adiposity which is thus associated with lack of function of the posterior lobe has the name dystrophia adiposo-genitalis, because the hypophysis has a decidedly close relation to the development and preservation of the genitalia. In the younger years, before adolescence, anomalies of the hypophysis, as a rule, cause failure of development of the ovaries and of the uterus and of the other structures characteristic of the female. After adolescence anomalies of the hypophysis result in atrophy of the genitalia. The same thing, lack of development of the genitalia, is true with giants and dwarfs. In the one case there is too little secretion, in the other there is too much, and yet with either of these alterations genital dystrophy may occur. The same genital change holds true in acromegaly. In fact, so pronounced are the changes in the ovaries with this latter condition that, in the minds of many investigators, hypofunction of the ovaries has been considered the primary factor in causing the changes in the hypophysis which are responsible for acromegaly.

Changes in the secretion and functions of the hypophysis have other effects than on growth and stature, than on the genitalia, than on the accumulation of fat and the metabolism of sugar. Changes in the secretion of the hypophysis are associated with alterations in other gland functions in the body. The relationship of the hypophysis to the adrenals, the pancreas, the thyroid, etc., is very close, but not so intimate as with the ovaries. The relationship of hypophysis to the psyche is close, for the various forms of hypophysis disease may produce nervous annoyances and psychic manifestations and states resembling "hysteria, neurasthenia," etc.

Tumors of the hypophysis are frequently the cause of these diseases. In some cases they cause too much secretion, and in some cases they are responsible for a diminished secretion. In addition, they may produce symptoms due to their size and to the pressure which they produce within the cerebrum

and on other nerve tissue. But, aside from this, functions of the hypophysis are altered and interfered with, without the presence of tumors. It seems that infections, intoxications, diseases of other glands, pregnancy, menopause, and other states produce structural or functional alterations in the hypophysis, as they do in any or all of the other glands.

It must be remembered that either lobe may be involved independently of the other, or that both may be affected at the same time. Either may be oversecreting, or undersecreting, without regard to the changes occurring in the other portion. In this way various combinations of phenomena and symptoms may be produced, involving bony growth, stature, accumulation of fat, alterations of temperature and pulse, changes in the other glands, psychical alterations, etc., resulting in symptoms which can be classified under no definite heading, but which require patience and attention to eventually diagnose and treat.

Hypopituitarism.—We may have hypopituitarism originating before adolescence or originating after. If hypopituitarism predominates, there results adiposity with skeletal and sexual infantilism in childhood (Fröhlich). Adiposity with sexual infantilism of the reversive type results when hypopituitarism originates in the adult. The posterior lobe secretion possibly discharges into the cerebrospinal fluid. The anterior lobe discharges secretory products into the blood stream. The anterior part is more closely related to other glands, but controls skeletal growth. Posterior lobe is more closely allied to tissue metabolism, and to the activity of the renal and vascular systems. Normal posterior lobe activity is essential to carbohydrate metabolism. A diminution of this secretion leads to a high tolerance for sugars, with a resultant accumulation of fat. In the majority of cases of adiposity there seems to be incomplete metabolism. The ineffectual burning up of the carbohydrates causes subnormal temperature. This is also common to insufficiency of the thyroid and adrenals.

Many cases of infantilism are due to a primary thyroid insufficiency. "Many cases regarded primarily as of thyroid

origin, especially cretinoid states, may actually be due to defective hypophyseal activity, which is often associated with actual enlargement of the thyroid." Many types of skeletal undergrowth, as we know from the action of the anterior lobe in processes of growth, are due to hypophysis rather than thyroid. Hypophyseal cretinism and infantilism are recognizable, clinical entities. Adiposis dolorosa is probably disturbed metabolism, secondary to disease of the ductless glands. Thyroid extract is actually of benefit in cases of hypophyseal obesity. Most cases of undoubted hypopituitarism have exhibited some degree of psychic disturbance, varying from nervousness to epilepsy and actual mental derangement. Pituitary deficiency, like thyroid deficiency, may cause signs of mental instability without encephalic lesion. "And there can be little doubt but that many of the psychasthenias and neuroses of one sort or another will prove to be associated with ductless gland disturbances, more particularly with those of hypophyseal origin" (Cushing).

A powerful galactogogue substance exists in the posterior lobe. The posterior lobe extracts have a specific action on smooth muscle (and especially on uterine fibers), and express the milk.

In preadolescent hypopituitarism there is a tendency toward persistence of sexual infantilism and an imperfect or delayed acquirement of the so-called secondary sex characteristics, just as in hyperpituitarism after puberty there is a tendency to testicular hypoplasia, impotence, amenorrhea, and some loss of secondary characteristics.

In pregnancy the pars anterior shows a multiplication of large neutrophilic elements, which are apparently derived from the normal cells (Hauptzellen). After labor the gland involutes, but never goes back to its previous size. This change, occurring in successive pregnancies, may bring about a physiologic inactive condition of the gland, and may produce the adiposity, loss of hair, asthenia, subnormal temperature, often seen after many pregnancies. On the other hand overactivity may persist, leading first to acromegalic changes with final

insufficiency. The interstitial cells of the genital glands and the corpus luteum exercise an important rôle in interglandular relations.

This hypophysis gland reacts normally to bacterial intoxication, and animals subjected to a partial hypophysectomy are extremely susceptible to infections, so that it is evident that the gland secretes some protective substances.

With inefficiency of the hypophysis, somnolence is noticeable, just as in hibernation. There is a tendency toward great sleep, subnormal temperature, slow pulse, lowered metabolism, a definite hypesthesia of the body to painful stimuli, and a hypoplasia of the sexual glands.

Hypopituitarism.—After a complete removal of the hypophysis, a subcutaneous or intravenous injection of the emulsion of a single fresh gland would temporarily arouse to apparently normal activity a somnolent animal in whom a subnormal temperature betrayed the onset of a cachexia hypophyseopriva.

The manifestations of glandular deficiency, whether or not they are accompanied by pressure symptoms or by evidences of pre-existent overactivities, with more or less marked overgrowth, are (Cushing):

A tendency to subnormal temperature.
Dry skin.
Loss of hair.
A slow pulse.
A lowered blood pressure.
Asthenia.
Increased assimilation limits for carbohydrates.
Often associated with a tendency to adiposity.
Obstipation.
Polyuria.
Psychoses.
Tendency to epileptiform seizures.

"The malady is a polyglandular one, and hence, in addition to hypophysis, may be helped by other glands, such as *adrenal and thyroid*. Even after a year of glandular feeding,

amenorrhea may be relieved and *libido-et-potentio sexualis* may be restored. It only rarely has a marked effect on obesity. A combination of thyroid and hypophysis may stimulate tissue katabolism. Hypophysis extract may produce mental and physical rejuvenation; raises body temperature, raises blood-pressure, benefits obstipation, removes the drowsiness, improves mental activity, on the use of several grains of the dried whole-gland preparation three times a day. In some cases it works beautifully by hypodermic use.

"*Adipositas dolorosa, universalis,* and *dystrophia adiposo-genitalis* are due to posterior lobe deficiency. To this symptom-complex of adiposity is added high sugar tolerance, subnormal temperature, slowed pulse, asthenia, drowsiness, all due to deficiency of the posterior lobe. The reverse condition follows on posterior lobe administration; namely, emaciation, spontaneous glycosuria, slightly elevated temperature. This may be produced by injections or by administering gland preparations by mouth. The adiposity of hypopituitarism is a generalized one, invading other organs, too, such as the liver. Increased deposition of fat may occur, also with deficiencies on the part of the sex glands, the thyroid, and possibly, too, the pineal and adrenal."

"Insufficiency of the posterior lobe may be associated with stimulation or inhibition of the anterior lobe; hence, coupled with obesity, we may have the combination of overgrowth with sexual precocity or the reverse, or undergrowth with sexual precocity or the reverse. (The sexual precocity, I think, may depend on other elements.) Hypertrichosis, adiposity, pigmentation, high blood-pressure, may be due to hyperadrenalism. Precocious sexual development, overgrowth, adiposity, may be due to hyperpinealism."

Dercum's disease means adiposity, tenderness and pain, asthenia, psychosis.

"Extracts of the posterior lobe possess diuretic properties. The administration of posterior lobe extract causes an increase in the urinary output. A hormone in the pars nervosa activates renal secretion. There is, therefore, difficulty in explaining

the diuresis which accompanies hypopituitarism, for one would expect these individuals to show a lowered urinary output. Some of the cases constitute almost a diabetes insipidus. In experimental hypophysectomy the amount of urine in animals increases to 2000 c.c. in twenty-four hours" (Cushing).

Blood-pressure.—"Hypopituitarism means low arterial tension, often below 100. When patients complain of asthenia, also, the pressure may be down to 70. Even in some cases, where the anterior lobe was still hyperactive, the pressure was low. There are some exceptions as regard low pressure with insufficiency, for the tension may be high. The low pressure with asthenia and pigmentation suggests that, even when the malady is hypophyseal, a secondary change in the adrenals, in the way of inactivity, may be responsible for these symptoms."

Low blood-pressure is present with hypopituitarism. Many acromegalies have a slight eosinophilia.

Hyperpituitarism.—If hyperpituitarism predominates there is overgrowth, resulting in gigantism when the process antedates ossification of the epiphyses (Launois); acromegaly when the process occurs after ossification. Hypophysis hyperactivity before adolescence and before ossification produces large stature; after ossification it produces acromegaly.

To cause skeletal undergrowth, glandular insufficiency must have been evident before full stature is attained; that is, before adolescence, though hypopituitarism later will dwarf the stature. That is likewise true in deficiency of the thyroid, the adrenals, and in alteration of the thymus.

There is one certain experimental method of inciting skeletal overgrowth, and that is by early castration.

The hypertrophic enlargement of the hypophysis gland, or the histologic hyperplasia, are primary in the case of acromegaly and gigantism, but are secondary in the case of eunuchism.

Hypophyseal hyperplasia is responsible for the rapid body growth which normally occurs at puberty. An exaggeration of the growth produces what is known as a "normal giant," an individual normally proportioned, sexually intact, with great physical strength. If this growth ceases for a time, then sub-

sequent hyperplasia will produce acromegaly if ossification has taken place. As stated, acromegaly occurs if there is an interval between the two stages of hyperplasia. (An early postadolescent period of hyperpituitarism leads to physiologic overgrowth or normal gigantism.)

Many cases of hyperplasia show quiescent periods, after which recrudescences may occur. In other cases the process is permanently checked, the clinical traces of skeletal overgrowth being the only evidence. In others there results a change to glandular insufficiency, as the result of involution which may follow on the process of hyperplasia. The early growing child may show only coarseness of the tissues or other minor signs of a mild hyperplasia (Cushing).

"A spontaneous mellituria, even of such a degree as to simulate diabetes and to be accompanied by furunculosis, is not uncommon in acromegaly and gigantism, and, I presume, that during the actual period of hyperpituitarism a low sugar tolerance, if not actual glycosuria, is probably found in all cases. Glycosuria is only a temporary symptom, and a giant or acromegalic may be in an active, quiescent or retrogressive stage of hyperpituitarism, and hence metabolism changes accordingly. The changes differ as much in the early and late stages of acromegaly as occurs between "Graves' disease and myxedema" (Cushing).

Whether obesity from castration may not occur through the resultant diminution of the ovarian function, or whether, contrariwise, the obesity of castration may not occur through the associated change in hypophysis and thyroid activity, cannot be settled. Whether the obesity of castration is due to the fact that the hypophysis, in spite of its hypertrophy, or because of an insufficient hypertrophy, does not make up for the loss of the ovarian secretion, is to be cleared up in the future.

There are certainly puzzles in this question. That conditions which are to be referred to increased activity of the hypophysis, such as acromegaly on the one hand, and a partial destruction of the hypophysis on the other hand (hypophysis obesity), should both cause an atrophy of the genitalia, no

longer seems strange. A like condition exists in the sphere of the thyroid, where Basedow's disease and myxedema may lead to an inhibition of the genital function. Because of the relation between hypophysis and ovary, Thumin advised the treatment of acromegaly with ovarin, and advises the use of hypophysis extract for the treatment of uterine bleedings and other conditions due to hyperfunction of the ovaries. The extract of the posterior lobe acts like adrenalin, strengthens and slows heart activity, increases the amount of urine, and increases the contractility of smooth muscle fibers, but it stimulates menstruation. I believe the anterior lobe does not.

"At puberty changes occur which, if the hypophysis is unstable, may so alter the biochemical processes of the body that they border on the pathologic. The rapid increase in stature during the adolescent period probably accounts for the occasional spontaneous glycosurias of this period. This is probably true also in pregnancy in which there is a transient physiologic hyperpituitarism."

"In pregnancy hypertrophic changes occur in the gland. Functional alterations occur comparable to those which more obviously affect the thyroid. It is possible that hyperplasia of the hypophysis may account for some symptoms during the last weeks, when there may occur fleeting bitemporal hemianopsia, hypertrophy of the turbinates, temporary enlargement of the lips and nose, with thickening of the tissues of the hands and feet, the frequent glycosurias of pregnancy, and increase in stature" (Cushing).

We may have an over- or underactivity of both anterior and posterior lobes or of either one. There are mixed or transition cases with some features of both states. This may be called dyspituitarism. There may have been an overgrowth of one or both lobes, followed by insufficiency of one or both lobes. Other individuals suggest by undergrowth and adiposity, as well as by high sugar tolerance, an early interference with both lobes. Dystrophia adiposo-genitalis (Bartels) is due to glandular insufficiency. All cases of original hyperpituitarism associated with tumor may end in hypopituitarism. Many

cases with existing hypopituitarism show traces at least of an early tendency to hyperpituitarism. Stages of pathologic overactivity of the gland tend toward a final stage of sluggishness in the way of secretion. Symptoms of one may be mixed with symptoms of the other. Hence the value of the term dyspituitarism.

Just as in the hyperthyroidism there are periods of remission and spontaneous cure, so the same occurs in hypophysis affections.

"It is probable that there are strains which run through families on Mendelian laws, and which betray the existence of ductless gland irregularities, unrelated to any postpartum influence. This includes inherited instability of the hypophysis. There are authentic instances of family diabetes of both kinds (mellitus, insipidus). Instability of the hypophysis may cause in various members of different generations hyperfunction in some, hypofunction in others. A functional glandular instability may make various members of the family susceptible to various alterations" (Cushing).

In recent years hypophysis diseases have been treated successfully by operations. Because of the antagonism between hypophysis and ovary, Thumin advises the treatment of acromegaly with ovarin, and advises the use of hypophysis extract for the treatment of uterine bleedings and other conditions due to hyperfunction of the ovaries. The extract of the posterior lobe acts like adrenalin, strengthens and slows heart activity, increases the amount of urine, and increases the contractility of smooth muscle fibers. For the last reason, pituitrin acts well on the bladder and uterus. It has a styptic action in various bleedings in the non-pregnant uterus (?) is a bladder tonic, and acts well in some cases of osteomalacia, and of course acts well in uterine atony in labor.

The Adrenals

Secretion of the adrenal glands is increased in great emotion. The adrenal glands are subject to splanchnic influence. Impulses are normally sent along these nerves in the

natural conditions of life when animals become greatly excited, as in fear, rage, or pain.

Since the adrenal glands are intervated by the sympathetic, and since the adrenal secretion stimulates the same activities that are stimulated nervously by this division, it is possible that disturbances in the realm of the sympathetic, although initiated by nervous discharge, are automatically augmented and prolonged through chemical effects of the adrenal secretion. (Cannon.)

There is every possibility that these glands are stimulated to extra secretion at these times. Injecting adrenin into the blood causes liberation of sugar from the liver into the blood stream. It relaxes the smooth muscle of the bronchioles. It acts as an antidote for muscular fatigue. It alters the distribution of the blood in the body, driving it from the abdominal viscera into the heart, lungs, central nervous system, and limbs. It possibly renders more rapid the coagulation of blood.

Glycosuria may be promoted by pain, in animals, and in association with intense pain, in human beings; it may arise from emotional excitement. In other words, in man emotional excitement produces temporary increase of blood sugar. Great muscular effort is accompanied by heightened arterial pressure. Emotions and great excitement may do the same. Blood from the adrenal veins causes relaxation of intestinal muscles characteristic of adrenal extract or adrenin. (Cannon.)

The spleen, the kidneys, and the intestines suffer a considerable decrease of volume when adrenin is administered. Adrenin causes active dilatation of the vessels in muscles, and constriction of cutaneous vessels. It is well known, however, that adrenin has a vaso-dilator, not a vaso-constrictor, action on the arteries of the heart. It is well known that adrenin affects the vessels of the brain and the lungs only slightly, if at all.

Adrenin is able to bring about a rapid recovery of normal irritability of muscle after the irritability has been much lessened by fatigue. This is due to a specific action of adrenin and not wholly to its influence on the circulation. Adrenin

opposes the effect of both curare and fatigue. What rest will do after an hour or more to a muscle whose original ability to respond to stimulation has been largely lost by continued activity through a long period adrenin will do in five minutes or less.

The liver seems to furnish continuously to the blood a factor in the clotting process which is being continuously destroyed in the body. It is not unlikely that adrenin makes the blood clot more rapidly by stimulating the liver to discharge this factor in greater abundance. Sugar and adrenin, which are poured into the blood during emotional excitement, render the organism more efficient in the physical struggle for existence.

"Every one of the visceral changes that have been noted,—the cessation of processes in the alimentary canal (thus freeing the energy supplied for other parts); the shifting of blood from the abdominal organs whose activities are deferrable to the organs immediately essential to muscular exertion (the lungs, the heart, the central nervous system); the increased vigor of contraction of the heart; the quick abolition of the effect of muscular fatigue; the mobilizing of energy-giving sugar into the circulation—every one of these visceral changes is directly serviceable in making the organism more effective in the violent display of energy which fear or rage or pain may involve." (Cannon.)

The Ovaries, Their Function and Relation to Normal and Pathologic States

Amenorrhea

Knauer transplanted the ovaries of rabbits and dogs between the fasciae of the abdominal wall and into the mesometrium, being careful to remove absolutely every bit of ovarian structure. In the abdomen he fastened the ovary with two sutures between folds of peritoneum, the ovaries being then nourished through endosmosis or through plasmatic circulation. New vessels grew into the ovarian tissue and furnished its subsequent support; this change began as early as the fourth day.

Examination at various periods showed that a small part of each ovary usually degenerated, and new connective tissue appeared in the place of the lost cells. In all cases in which a complete degeneration of the ovary occurred, atrophy of the breasts and of the genitalia was found. The muscle of the uterus was atrophied, the intermuscular connective tissue was increased, the mucous membrane was atrophied—changes like those which occurred after double castration. Retention of function on the part of the transplanted ovaries was always evidenced by the growth of follicles in a normal manner, by the ripening of the follicles, and by the discharge of the ova. In all such cases the normal character of the breasts, of the uterus, and of the genitalia was preserved, and in the younger animals all these organs underwent a natural development.

Knauer's results proved that the preservation to the organism of functionating ovaries preserved the breasts, the genital organs, and the sexual instinct. This result occurs through the absorption into the circulation of ovarian secretion. This internal secretion reaches the blood through the lymph-channels. The trophic function which the ovary exerts upon the body stands in closest relation to its ability to form ripe ova. Ovarian tissue which has ceased to develop ripe ova has lost its secretory function.

The normal human ovary produces and expels ova capable of being fecundated. Ovulation, as a rule, occurs from eight to ten days before menstruation, but it may occur at earlier periods.

The ovaries are glands with an outer covering of germinal epithelium, within which is a stroma or interstitial tissue containing thousands of follicles. The ovaries thus produce an internal secretion, probably two different varieties, and, in addition, the corpus luteum, which develops especially during pregnancy, produces a secretion perhaps of a different character, or at least of a more specific nature designed to stimulate the thyroid and inhibit the posterior pituitary tendency to bring about menstruation. When the ovaries begin to produce the accepted adult type of secretion, the result is made

apparent by the onset of menstruation. But they certainly are functionating before this period of puberty, and thus they may be responsible for some of those skeletal differences between the female and male type, such as the difference in the form of the pelvis. The ovaries are responsible for the proper development and nutrition of the external and internal genitalia. Their main protective influence is exerted upon the uterus, and more particularly upon its lining, the endometrium. Infectious diseases occurring in infants and children, which produce changes of an injurious nature in the ovaries of a permanent character, may result in the various degrees of under-development of the genitalia. These include measles, mumps, scarlatina, whooping-cough, diphtheria, tonsilitis, rheumatism, chorea, influenza, etc. These diseases of childhood and adolescence and the various infectious diseases may affect and injure not only the endometrium, the tubes, the ovaries, but likewise any one or more of the endocrines which are trophically related to the development of these genital structures. Removal of the ovaries results in a cessation of menstruation, and the absence of the trophic effect of their secretion upon the uterus is evidenced by its atrophy. Experiments made on animals have proved beyond doubt that removal of the ovaries in the newly born results in failure of development of the genitalia and of the breasts. Removal of the ovaries after development of the genitalia and the breasts produces regressive changes in these organs, especially in the uterus. If, however, these ovaries when removed from their normal site are transplanted elsewhere in the abdomen or in the abdominal wall, and establish a new connection in these areas, no regressive changes occur in the genitalia and in the breasts. It is a fact, then, that the ovaries, so long as they are "alive," no matter where they are situated, exert this trophic and protective influence upon the uterus and genitalia, through the medium of the circulation and this by virtue of an internal secretion or secretions.

The distinction between the genitalia of the two sexes themselves constitutes the "primary sex characteristics," but a

number of differences which are not connected with propagation, but which are characteristic of the being of the female, are called "secondary sex characteristics." Among these are the greater tendency to fat under the skin, and the resulting rounding of the body, the width of the hips, the marked development of the gluteal region, the length of the hair, the absence of beard, the difference in the larynx. The difference in the pelvis is very marked. There is a slighter development in the features of the face, especially the lower jaw. The brain is smaller. Psychically, even as children, there is a taste for different forms of play. The differences are already apparent between the ages of eleven and fourteen as concerns the rounding of the features, the increase in the fat, especially in the mammæ, in the gluteal region, on the thighs, etc. The most important of the secondary sexual characteristics are the breasts (Novak).

A remarkable development of the mammary glands take place at puberty. This development is influenced by the ovary. The mammary gland assumes the part of a secondary characteristic of the female sex, attaining to complete development under the influence of the ripening ovary. (The hypertrophy which takes place in pregnancy is not due to the ovary alone but to the trophoblast.) The real function of the mammary gland is developed by a secretion from the placenta, which promotes hyperplasia. The subsequent suppression of this secretion permits the onset of the secretory function and the posterior pituitary helps the development of this function.

The interrelation between the hypophysis and ovaries is extremely close. In the ovary there are four glandular elements:

(1) The follicles, concerned also with the production of ova.

(2) The false corpus luteum of menstruation.

(3) The corpus luteum of pregnancy, brought into existence by the reaction produced by placental ferments.

(4) The interstitial cell-body.

These interstitial cells are probably related to the acquire-

ment of the secondary sexual characteristics. "As a consequence of preadolescent castration the acquired characteristics of sex fail to appear. The reproductive functions covered by the follicles may not be impaired, even though complete secondary sexual characteristics have not appeared. The element of the ovary which is responsible for the constitutional physical changes which characterize puberty is probably the interstitial cell structure. Cases show imperfectly acquired secondary sexual characteristics when hypophyseal lesions antedate puberty, and a resultant amenorrhea with retrogressive sexual changes when the malady develops after adolescence" (Cushing).

Hypersecretion or hyposecretion of the hypophysis cause other changes than those related to the acquirement of adolescent characteristics. Thus, amenorrhea may be an early symptom with hypersecretion or hyposecretion of the hypophysis.

It must be remembered that the ripe ovary is filled with thousands of follicles in a quiescent state, and that at regular intervals at least one follicle develops, becomes larger, is filled with fluid, approaches the surface of the ovary, breaks through the ovarian covering, and throws out its liquor folliculi and the tiny ovum a few days before the expected menstruation, and the ruptured follicle develops the false corpus luteum. It may be assumed that this follicle, with its contained fluid and ovum, represents either an added amount of ovarian secretion or a new form of ovarian secretion. If no pregnancy takes place, the corpus luteum becomes smaller, and finally ends in a form of scar tissue. If pregnancy does occur, it develops into a progressively growing structure, known as a true corpus luteum. Why, in the first instance, does the follicle become a scar within a short time, and, in the second instance, why does it remain as a living functionating structure for several months? As the corpus luteum, it undoubtedly has a function. The explanation which we wish to make at the present moment is that the presence of the fecundated ovum within the uterus and the placental secretion which it throws into maternal circulation so stimulates the ovary (as it also stimulates other

glands) that the follicle reacts by a progressive change, and continues as a living, functionating part of the ovary instead of ending its follicle function by becoming a healed area. The purpose of the corpus luteum is to stimulate the thyroid (glandular) and inhibit the contractile action of the posterior pituitary on the uterus.

We know little about the secretion of the follicles, yet they probably nourish the uterine lining. It is true that subsequent ovulation in pregnancy is interfered with by the corpus luteum, so that pregnancy may not be interrupted by menstruation. The integrity of the uterus depends partly on the secretory function of the follicles, and they produce the impulse of nutrition in the uterus, which, together with the cyclic phenomena of premenstrual and menstrual congestion (interstitial ovary) and together with painless contractions between menstruation (posterior pituitary) prevent the uterus from undergoing atrophy. How much the hypophysis may have to do with these painless contractions is no longer a matter of conjecture. The ovary, especially the corpus luteum, produces a hormone, which, in association with the cyclic changes, causes and stimulates decidual cell growth.

The secretion of the interstitial part is now definitely known. It is related to the vagus apparatus, and hence the administration of lutein rarely corrects the annoyances due to climacteric changes. Biedl thinks that the interstitial gland controls the cyclic changes in the genital canal. There is certainly an antagonistic relationship between the corpus luteum and the follicles on the one hand and the interstitial gland on the other. Alterations in other glands probably do not affect these two elements in the same way or to the same degree. Diseases or secretory alterations of the ovary, as yet unrecognized, probably involve the follicle apparatus and the interstitial gland in a different way and to a different degree, so that there may be hyperfunction, or hypofunction, or either, in various combinations.

The ovarian secretion is responsible for menstruation. It is responsible for it in the following manner—it has a constitu-

tional action on various mucous and serous membranes of the body, but has a special cumulative, selective, periodic, congestive influence upon the uterus, whereby the uterus becomes filled with blood, the capillaries become dilated, the endometrium is stimulated to hyperplasia, becoming thicker and turgid, the interstitial cells becoming larger and hexagonal in form, so that the uterus, and particularly its lining, becomes a nest ready for any ovum which may settle within its cavity. This is a wonderful provision of nature to furnish a thick, hyperplastic, moss-like lining, on which and *in which* the fecundated ovum may embed itself. This provision is wise for two reasons—first, it gives plenty of blood to serve as nutrition for the ovum, and second, it makes a thick lining into which the egg may settle. It must be mentioned, at this point, that the ovum is, strictly speaking, a parasite, which, by the very nature of the growth of its outer layer into trophoblast cells and chorionic villi, has a decided tendency to grow deeply through the uterine lining into the uterine well. Here comes the added protective influence of the corpus luteum. This added factor further stimulates the uterine lining, making it a still thicker membrane, and in this way furnishing a favorable area into which the egg and its covering cells may penetrate, and, at the same time, by the very thickness of this membrane, protecting the uterine wall from invasion.

The first decidual changes in the uterus are produced by the ovaries. It is true that removal of the ovaries in pregnancy, if not too early, causes no marked change, for, in spite of double castration, pregnancy takes a normal course and so does the subsequent milk formation. It seems, therefore, that the ovaries trophically take care of the uterus and of the endometrium, prepare the endometrium for the nidation of the ovum, and then give way to other secretions, the placenta particularly. One ovary contains a corpus luteum, and, on theoretic grounds, it would seem that this is a secretion which should continue to protect the uterus, endometrium, and other body tissues against the local and systemic invasion of the chorionic villi and placenta. This may indeed be true, and,

after double castration in pregnancy, either this ovarian secretion or corpus luteum secretion remains as a ferment, and thus continues its activity, or else some other gland structures (especially the placenta) take up the function which the corpus luteum previously performs.

During pregnancy changes occur in various of the gland structures of the body. A decided change takes place in the secretory activity of the hypophysis, structural changes occur which last for months, so that the gland never goes back to its former antepregnant state. Quite frequently during pregnancy an evident stimulation of growth, slightly resembling acromegaly, brings the participation of the anterior hypophysis to our notice. Since the introduction of pituitrin, with its oft-times magic effect in stimulating and accentuating labor pains, we have proof again that the hypophysis is concerned in various ways in the processes of pregnancy. The introduction into the body economy of the placental element, which constitutes a secretion, has its effect beyond doubt upon various gland structures of the body, and it is quite possible that this secretion is responsible for the corpus luteum and for the maximum decidual reaction, either by direct influence on the uterus or indirectly through the corpus luteum.

It is not to be understood that only the thickness of the decidua protects this lining and the uterine wall from penetration by the villi; other factors enter into consideration; namely, certain elements or enzymes from other glands in the blood and in the decidua, which exert a delimiting effect on those cells, which grow into the decidua, are at all times being abter and penetrating power of these trophoblast cells as to in this way also protect the uterine wall from their too deep growth. It must not be overlooked that these very trophoblast cells, which grows into the decidua, are at all times being absorbed and thrown into the blood current, where they circulate, become dissolved, and constitute what we have called the *placental secretion,* a secretion which exerts an influence on the mother from the very first moment that a fecundated ovum embeds itself; in fact, the only satisfactory explanation for the

cessation of menstruation when pregnancy occurs is furnished by making use of the fact that a placental secretion exists. This secretion, when absorbed, plus the corpus luteum, acts as an antagonist to that part of the ovarian secretion, pituitary and adrenals which causes menstruation. It has already been stated that the ovarian secretion produces the congestion and hyperemia in the premenstrual few days. This congestion and hyperemia rises to such a high pitch that diapedesis and rhexis occur in the capillaries of the endometrium, which relieves the tension in that tissue, the consequent loss of blood constituting the phase known as menstruation. It can be readily understood that an overstimulation on the part of the ovarian secretion may be responsible in this way for a too profuse flow of blood. The character of the blood itself, or a lack of a proper coagulating ferment, or an abnormal character of the capillaries, may be responsible for a too profuse flow of blood. An abnormal type of endometrium, such as is commonly called "fungoid," or the existence of a diffuse or localized polypoid form of mucous membrane, may result from overstimulation by ovarian hormones or by the posterior pituitary or by the adrenals, and may be readily responsible for an excessive flow of blood. A uterus which does not contract well and which, because of rhythmic repeated contractions of insufficiently effectual power, does not hasten the approach of the relative anemia of the postmenstrual period, will naturally be responsible for a too excessive flow or a too protracted flow of blood. In other words, if a uterus is normal, if its lining is normal, and if the blood is normal, such a uterus is able to resist the hyperemic congestive influence of the ovarian secretion for a certain period only. That period follows in the human being, as a rule, the type of twenty-eight days. If this secretion is too powerful in its effect, or if the blood or the lining of the uterus are abnormal, then the capillaries cannot resist this congestive influence for the period of twenty-eight days, and menstruation occurs too early or else too long. On the other hand, the ovarian secretion, or the other gland secretions, may be of such a diminished energy or power that it is unable in an

interval of only twenty-eight days to produce sufficient tension or change in the capillaries as to have them break and allow a flow of blood; or the endometrium or the capillaries may be so constituted or altered that they resist this power of the ovaries and other glands, and for either of these reasons the menstrual interval is prolonged to five weeks, six weeks, two months, or ofttimes longer, regularly or irregularly. This does not of necessity affect the power of the ovary to produce ova capable of fecundation. When the ovarian enzyme, or enzymes, are producing this congestion in uterus, and bringing on such a turgid condition of the endometrium as to presuppose the relief of this state by the outflow of blood, if before this time a fecundated embedded ovum throws its own particular enzyme into the circulation, it either nullifies this particular phase of the ovarian, pituitary and adrenal secretions' activities or else it locally, or through the blood, affects or alters the capillaries, and by either of these two processes the outflow of blood is inhibited. It may be, then, taken for granted that during the succeeding months of pregnancy it is the particular function of the ovarian secretion, with the newly added power of the corpus luteum, to trophically nourish and stimulate the uterine lining and the uterine wall, and to thus protect it against the local activities of the ovum. We have a right to suppose that the ovarian secretion, together with the added secretion of the corpus luteum, has a constitutional influence whereby its enzyme power is exerted to influence that secretion which the ovum, through the growth of its outer layers, is continually throwing into the body. In other words, we may with reason express the conviction that the ovaries are among the glands which aid the mother in her fight against the local and constitutional activities of the parasitic ovum and its placental secretion.

We know that the development of the genital glands is influenced by a large number of internal secretory organs. Early and exceptional development of the body and genital glands may be the result of tumors occurring in the suprarenals, in the pituitary glands, or the pineal gland. Other

hypophyseal affections, except overactivity of the posterior lobe, tend, as a general rule, to genital atrophy.

The effect of late genital maturity, like that of genital hypoplasia, is to increase the height, especially the length of the legs, while early genital maturity causes premature closing of the epiphyses and is associated with short legs. The relationship between the ovaries and those other secretory organs which influence the growth of bone is remarkable. Castration is followed by changes in the thyroid, thymus, adrenals, hypophysis. Removal of the ovaries causes an increase of the hypophysis. Certain changes in pregnancy resembling acromegaly are due to primary hypofunction of the glandular ovary and secondary hyperfunction of the anterior hypophysis, since, during pregnancy, normal glandular ovarian activity is in a way inhibited. The menopause is associated with regressive changes in the internal secretory organs, especially the thyroid, but overactivity of the posterior pituitary may persist.

After castration metabolism is much reduced. The diminished metabolism may be raised by ovarian extract. The increase in metabolism is due to the changes in substances which do not contain nitrogen. There is a close relationship between the ovaries and the suprarenal medulla and cortex. The principle rôle in osteomalacia, too, is played by the ovaries. The ovaries have always been considered as a factor in chlorosis, either through hypofunction or malfunction. Wallart thinks there is a relationship between the interstitial ovarian secretion and the formation of the blood.

Castration never produces the positive characteristics of the opposite sex, but results in a certain fixation of an infantile type. Early castration is followed by excessive longitudinal growth, a lack of proportion between the length of the trunk and that of the extremities.

It seems that after castration the body length is greater. The sella turcica is then increased as an expression of the enlargement of the hypophysis. Removal of the ovaries causes a great atrophy of the uterus, has a little effect on the vagina, and almost none on the external genitalia, since these are

trophically supported by the posterior pituitary. In individuals castrated during the early years the instinct of sexual desire does not exist unless there has been a preceding somatic psychic-sexual puberty. Has there once been an awakening of the sexual desire, or an actual experience of it, then the memory pictures obtained thereby (the so-called libido centralis) work against the disappearance of the "Geshlechtstrieb" after castration. For this reason the majority of cases of castration find little difference in libido. Libido is more dependent on posterior pituitary than on the ovaries.

Puberty is a critical period for the growing girl. The ovary begins to manifest the power which it is to exert for many years. It exerts its function to a heightened degree locally in the pelvis; it exerts its function probably on psychic channels; and it, in all probability, so stimulates other glandular functions that the organism of the girl adapts itself to these new influences with variations, from that of a simple adjustment, up through the various degrees of temporary maladjustment to the highest degree of temporary or protracted maladjustment. In this connection, we must pay attention most particularly to the elements of the thyroid and posterior pituitary secretion. When the ovary begins to assume its full active position in the economy of the growing girl, changes of a marked nature occur with a certain degree of twenty-eight day regularity. We must credit the impulse of these changes to the secretion produced by the ovaries. By cumulative action, a gradual congestion and hyperemia and a stimulation or irritation in produced in many portions of the body at intervals of twenty-eight days. Before and during menstruation the vocal chords become hyperemic; the same hyperemia occurs in the mucous membrane of the stomach and intestines and in the mucous membrane of the nose. There is a tendency to irritability in the central nervous system, the breasts become full and sensitive, there is a feeling of weight in the pelvis. These symptoms, and other annoyances of a still greater degree, in many instances precede the onset of menstruation, and represent the highest point of the premenstrual wave, the

symptoms persisting more or less during menstruation and then gradually ebbing away. Some patients are almost unaware, so far as constitutional manifestations are concerned, of the onset of menstruation, while others can foretell this period by one or more of these prodromal symptoms. So far as the irritability of the nervous system is concerned, the degree to which the individual reacts to the premenstrual and menstrual stimulus is an index of the stability of the endocrine system. It is not so much the fact that ovarian secretion of different strengths effects these different degrees of irritability, etc., as it is that organisms and nervous systems of different grades of resistance react differently to this premenstrual change in all the endocrines. A question of importance concerns the probability of other secretions than the ovarian, such as posterior pituitary, adrenal medulla, thyroid, as factors in the production of some of these annoyances.

Many girls enter into the menstrual phase, irregularly or regularly, with few, if any, constitutional annoyances. Some go on in this placid way during a greater or the entire portion of their lives, unless some intercurrent condition alters this smooth progress. Others at some subsequent period acquire varying degrees of constitutional phenomena in association with the premenstrual and menstrual cyclic phases. In some instances puberty has associated with it symptoms of an annoying character, which may disappear after a certain period of time, or which may persist or grow worse at a later period. At puberty there is a tendency to cardiac irregularity, shortness of breath, and symptoms of a nervous nature, which may be due to the inability of the system to adjust itself calmly to the ovarian secretion, or it may be due to the fact that the ovaries, which are to be viewed as closely related to the thyroid, pituitary and adrenal glands, so stimulate the glandular thyroid and the adrenal medulla and the posterior pituitary that these act irregularly, often with too great force, and, therefore, though in varying degrees, the individual is really suffering from hyperthyroidism, a hyperactivity of the adrenal medulla or hyperactivity of the posterior pituitary. In some

cases the ovarian secretion and corpus luteum are constantly stimulating the thyroid; in other instances, it may do so at irregular intervals. It may be seen from these statements that either secretion may stimulate the other gland, or may influence the other by its own superior power. In other words, the ovaries may secrete too little. If the thyroid secretion does not diminish in equal ratio, then there is, relatively speaking, too much thyroid in the body. There may, on the other hand, be too much thyroid secreted, and this may so antagonize the secretion of the ovaries that their function is not properly carried out. The ovaries may be secreting too much, and this excess of secretion may either overstimulate the thyroid gland or may antagonize, and, to a certain degree, inhibit the thyroid gland's function. In some instances there may be too much secreted by both thyroid and ovary; in other instances they may each be secreting entirely too little. In this way there may be produced a variety of symptoms, either before or during menstruation, or at certain regular or irregular intervals, or more or less continuously. What part the hypophysis and adrenals may play in the production of these relations, or what part they may play in association with ovarian and thyroid secretions, is quite apparent. It is of interest to recall a few facts concerning the thyroid gland. The thyroid gland has an important function in women, and it is abnormally altered in them much more frequently than in men. Myxedema and Basedow's disease are far more frequent in women than in men. The thyroid gland seems to swell before menstruation; during pregnancy, before and during labor, though the stimulation produced by the corpus luteum and the trophoblast. The frequent tendency to irritability of the nervous system during these periods is to be traced to the relation between the ovarian, pituitary, adrenal and thyroid secretions, which practically at these times constitutes a hyperthyroidism, or hyperadrenalism, or hyperpituitarism. On the other hand, there are actual periods of hypothyroidism, hypoadrenalism, hypopituitarism, associated with which there may be a coincident diminution of the ovarian function, or the ovarian function may be actually

or relatively increased, and it is possible that in certain cases actual hyperfunction on the part of the ovaries may be responsible for a relative hypofunction of the thyroid. It may be readily seen that this play of the secretions, altered as their relation must necessarily be during the various phases through which womankind goes, renders instability of the nervous system quite frequent. It is this condition which aids materially in making womankind the weaker sex, and not until the menopause comes on, and not until the ovarian secretion and the thyroid and other endocrines finally assume a quiescent and not constantly changing relationship, do thousands of women find that peace of bodily, nervous, and mental function to which we give the name of good health. When, to these various alterations, there is added the function of the breasts and the influence which lactation or the absence of lactation exert we have another factor which increases the instability of which we have made mention.

Development of the breasts depends to a great extent on the trophic stimulation of the ovaries and the posterior pituitary. They develop markedly before puberty. In the climacterium there is a progressive atrophy of the mammæ. The relation between the two, mamma and genitalia, is not through nerve channels only. Hypoplasia of the mammae occurs in young animals after castration and may be avoided by ovarian transplantation. The pregnancy changes in the mammae are due to some new internal secretion. The development of the breasts before puberty, their rapid growth at that period, their swelling before menstruation, their atrophy at the menopause, are dependent primarily on the secretion of the ovaries. What new secretion prompt the marked hypertrophy during pregnancy and the secretion of milk after labor? Both these alterations take place even if the ovaries have been removed early in pregnancy. According to Halban, the placenta during pregnancy assumes some of the functions of the glandular ovary, the activity of the latter being supposedly inhibited during this state. After labor, when the placental secretion is no longer to be considered, a puerperal involution takes place in

the mammae and milk is secreted. It has often been noticed that the secretion in the breasts during pregnancy changes to milk when the fetus dies; hence, cessation of function on the part of the placenta seems to be necessary to starting the secretion of milk. On the other hand, injection of placental extract increases the milk secretion in nursing animals and rouses a secretion which has nearly stopped. According to Halban, ovarian secretion and the placental secretion have analogous functions. From the theoretic standpoint, it always seemed to me that the interstitial ovary and placenta are antagonistic, and that the ovary is one of the glands which protects the uterus from too deep inroads on the part of the trophoblast cells. At any rate, the ovaries and other endocrines, when they again come into function after labor, are able to produce in the breasts the secretion of milk. In other words, the ovaries take trophic care of the breasts; when placental secretion is added to the circulation some preparatory change takes place in the mammae which is essential to milk formation. Milk formation then takes place only when this placental secretion is removed as an active factor. Then, it seems the ovaries, posterior pituitary and the other endocrines aid in establishing the flow of milk, though this occurs even when the ovaries have been removed. What relation the thyroid bears to milk formation is not known. We do, from practical experience, realize that small doses of thyroid extract or of suprarenal extract stimulate the breasts to increased function, but this is probably only another evidence of the great importance of the thyroid and other glands in the metabolism of the body.

In climacteric uterine atrophy there are usually anatomic or clinical evidences of a hypofunction of the ovaries. The absence of molimina menstrualia speak for like atrophic processes in the ovaries and uterus. Senile involution and lactation atrophy are in a degree physiologic. Thorn believes that stimuli which pass out from the mammae are the cause of uterine contractions which result in lactation atrophy. Lactation atrophy is probably a result of a temporary cessation of

function on the part of the ovaries, with contraction of the uterus produced by mammary secretion, or is due to a diversion of ovarian trophic influence to the breasts, in this way depriving the uterus of its regular stimulation. In lactation atrophy vasomotor annoyances, such as seen after castration, are not evident. Some ovarian activity perhaps persists. That part of the ovary which prevents flushes is intact, though there is a disturbance of the follicle secretion resulting, as a rule, in failure of ovulation when amenorrhoea exists.

CHAPTER V

THE ENDOCRINES IN GYNECOLOGY

First, a few words about the physiology of the normal functions. Menstruation is dependent upon the normal development of the genitalia and the normal trophic control of these structures. The glands of greatest importance are the ovary, the thyroid, the pituitary and the adrenals. Every menstruation is a crisis in which the ovary, thyroid and pituitary especially participate. Menstruation is preceded by premenstrual phenomena varying in intensity and degree according to the actions and interactions of these glands. Excessive activity of the pituitary is characterized by the same uterine contractions and cervical changes as occur in labor. Menstruation is a miniature labor, labor is a magnified menstruation.

Physiological amenorrhea occurs during pregnancy and at the climacterium, and during lactation. The amenorrhea of pregnancy is due to the inhibiting influence of the trophoblast, chorion and subsequent placenta. The amenorrhea of lactation is due to the inhibiting influence of mammary secretion acting on uterus, ovaries and related glands.

The inhibiting influence of the mammary secretion is by no means absolute, for many patients either menstruate during lactation or after the first few months of lactation or conception may take place during the amenorrhea. The amenorrhea of pregnancy is generally absolute. But during this whole period there is a contest between the glands producing menstruation and the inhibiting secretion from the ovum. Many patients have menstrual molimina during some or all the months of gestation; some have varying degrees of spotting or staining at what would have been menstrual periods; others menstruate or bleed profusely, the uterus contracts and the ovum is expelled. In other words, the secretion of the ovum was unable to inhibit the combined activity of the ovary, thyroid and pituitary for the normal period of two hundred

and sixty odd days. This then is the explanation in the greatest proportion of cases of habitual miscarriage.

The thymus gland is supposed to regress and by its regression and the removal of its inhibitory influence, development of the sex organs is allowed to proceed. Therefore an early or late regression or a failure to regress is supposed to influence the period when menstruation develops and the character of the menstruation.

Tumors of the hypophysis, the pineal gland and the suprarenal gland have resulted in many instances in an exceedingly early and notable development of the genital structures. This precocious sex development, however, is not associated with a correspondingly early and precocious development of the brain and mental maturity.

With this preliminary sketch it may be readily recognized how the activities of the sex organs of the female are influenced in the way of stimulation and inhibition by the other endocrine structures and it must be apparent that primary activities of these sex organs may correspondingly affect the associated endocrines.

Many points of interest are elucidated in history taking; the age at which menstruation was first established, its regularity, duration and other important data. Severe premenstrual phenomena consisting of physical and psychic deviations point to an exaggerated susceptibility on the part of the patient and to an instability in the endocrine chain. Early appearance of the menopause, especially when it is a familial tendency, speaks for a lessened energy of the endocrine chain in its relation to menstruation. Women whose menstruation occurs say at thirty-five day intervals are in need of endocrine stimulation. They are more likely to begin labor at a date later than estimated. Women with hypoplasia of the uterus and those who become pregnant after endocrine therapy often have a long and tedious labor. Women who have repeated miscarriages are probably hyperpituitary and when they finally do carry a viable child may not go to full term. Some women are delivered in successive pregnancies say three weeks before

the expected date each time. The longer the period of amenorrhea during lactation the less assertive are the endocrines of that individual in regard to menstruation. It must be stated that, because the endocrines are normal in their co-operation in relation to menstruation, it does not necessarily prove their stability as related to other physical and mental functions, but it certainly points in that direction.

We may on pelvic examination likewise discover conditions due to the endocrines. But the outward physical manifestations of over- or under-activity may be relatively absent, particularly if the changes in the gland relationship have been recent. We know that gland abnormality may be evidenced in one individual by predominantly physical signs, in another predominantly evidenced by altered visceral function or metabolism. In another the effect is predominantly on the mental reactions and psyche. In extreme cases there are various grades of combinations of all three.

The uterus may develop subnormally with a resulting hypoplasia and subnormal menstruation. The uterus may have developed normally and only subsequently may its size and the degree of menstruation diminish. Here is a distinction between hypoplasia and atrophy. Development may be delayed and uterine hypoplasia may be only an intermediary stage leading to subsequent normality. Body growth may be backward and yet subsequent endocrine autostimulation may produce a normal individual. Hypophysis overactivity may develop a normal giant or a real giant. Late overactivity of the hypophysis produces the acromegalic individual. Late hypothyroidism is a different picture from the infantile or childhood type.

Varying degrees in the intensity of the gland changes, as well as in the location and extent, furnish gradations in symptoms. Consider, for example, hyperthyroidism. We may have a typical Graves' or Basedow's disease with exophthalmos, goitre, tachycardia, tremor and associated gastric and nervous annoyances. There may be varying degrees of severity and toxicity; there may be marked involvement of associated

glands. We may, on the other hand, have simply a paroxysmal or continuous tachycardia, or only the nervous manifestations, or menstrual anomalies may first dominate the picture in the latent cases. Therefore, as regards changes in the endocrines, we may have innumerable variations in the location, intensity and extent of the symptoms. Just as we have varying degrees of pulmonary tuberculosis, we may have, I believe, variations in the involvement of the suprarenal glands, for instance, and it would be only following this analogy to say that early and unrecognized involvement of the suprarenals may go on to healing, and the cause of the associated asthenia, with or without slight skin manifestations, may be unrecognized.

With a given etiology we may have several of the endocrine glands injuriously affected. These may result in asthenia after labor, after prolonged lactation, after infections, after influenza and these should be diagnosed as cases of pluriglandular endocrine exhaustion. We may in other cases have one gland singled out for marked injury, as for instance the adrenals or the thyroid. On the other hand, the test to which any one or more of the glands have been subjected by physiological or pathological conditions may result in an increased secretory activity of one or more members of the chain, as in thyroiditis. The best instance of this is to be found during pregnancy and after labor when many patients give evidence of improved health, bony growth and general systemic exhilaration. This is merely a continuation of the increased glandular activity aroused in the endocrine chain by the growing ovum.

Based on the belief that the ductless glands preside over the development of the inherited body and mind, controlling and regulating many of their functions through all the years of life, the theory of treatment by endocrines follows two plans: 1, give those extracts of which the body is producing too little; 2, if the body is producing too much of any one extract, attempt to counteract this overactivity by giving other hormones which diminish, oppose or inhibit this oversecretion.

To go about this procedure rationally we must have a knowledge of the physiological action of the various glands and their probable hormones; second, we must note the changes produced by overactivity or underactivity of the glands as evidenced by definite physical and other signs essential to diagnosis; third, by the administration of gland extracts in a therapeutic manner we have the opportunity of verifying these physiological and pathological facts and by the results obtained we may prove the correctness or fallacy of either theory or diagnosis.

It must be stated that there are limits to the postulate of substitution. No one yet lays claim to curing well defined cases of Addison's disease by any method or form of administration of any part or of the whole of the adrenal gland substance. If the ovaries are removed and the uterus is left behind, no amount of ovarian or other extract, no matter how given, can succeed in keeping up normal, regular menstruation.

The limitations to the postulate of control or inhibition are furnished by the fact that our knowledge is as yet only fragmentary—if we give glandular material to oppose the activity of another gland, we may either succeed or we may rouse that or other glands to renewed activity, getting what might be expressed by the slang phrase "a kick, or comeback."

Another theory has been advanced in cases of overactivity of a gland, namely, that by giving some of its own extract we relieve the gland in question of the necessity of overwork. This technic has been followed by some workers by the administration of thyroid extract in hyperthyroidism and by the administration of pituitary extract for persistent headache in hyperplasia of the pituitary gland. For the present it is better to leave further discussion of this point in abeyance. This idea recalls to mind the much more rational plan of giving a gland extract when the corresponding gland is overactive and proving the correctness of our diagnosis by looking for and finding an accentuation of the annoyances. Therefore the giving of thyroid in latent hyperthyroidism often accentuates the nervousness, brings on a tachycardia, tremor and other symp-

toms. False labor pains may be differentiated from real ones by the action noted after the injection of pituitrin.

When the study of endocrines was a question of pathology and physiology, it was not an easy problem to interest the profession, but now that therapy has proved to be so valuable, we are finally on the road to further investigations. The most important fields for its application are pediatrics, mental diseases and gynecology. I believe the time will come when the majority of the physical and mental deficiencies of childhood and of the adolescent stage will be treated intelligently from the viewpoint of endocrine secretions.

I hold the same belief concerning the field of mental diseases (not syphilis). Here, however, progress is naturally bound to be slow, for the changes are gradual, often escaping observation by any but the observing in their early periods. Exact knowledge concerning the effects of endocrines on the various cerebral areas has not yet been revealed.

The greatest advance has been made in the application in gynecology. First, because the endocrines dominate the physiology of the special sex functions and phenomena; secondly, because therapy is often prompt and exact and convincing, when prescribed on the basis of physiology.

Due to the fact that many states are now recognized as due to endocrine abnormalities, gland extracts viewed simply from the viewpoint of therapeutics have replaced many of the old-time drugs because of their better and more specific action. For instance, we no longer use iron and arsenic alone in the treatment of amenorrhea; the preparations of ergot and hydrastis have been replaced by gland extracts in the treatment of menorrhagia and metrorrhagia; strychnine and allied stimulants are no longer relied upon exclusively for the treatment of various forms of physical asthenia. Restriction of a harmful diet or the imposing of a definite diet are not the sole factors in the forms of malnutrition of children, in altered metabolism of adults, and in the treatment of obesity.

Among the cases best treated by endocrines are to be included the patients with actual and relative amenorrhea as

well as lactation atrophy; menorrhagia, metrorrhagia, dysmenorrhea; sterility, one child sterility; threatened and habitual miscarriage; disturbances of the climacterium, fibromyomata; patients suffering from hyperthyroidism and hypothyroidism, dispituitarism and similar conditions. Naturally in many of our patients several of the diagnostic spheres mentioned above will overlap. The readiness with which one may undertake therapeutic measures, if the physiology is understood, can be well instances in the case of mammary extract. If nursing and suckling result in involution, then why not use mammary extract, not only for this purpose but for many of the forms of regular or irregular bleeding and for certain forms of fibromyomata and fibrosis.

It can be readily appreciated that this therapy does not give the same definite results in cases of apparently the same type, if we only consider that some women while nursing do not menstruate for periods of six months or a year, while others menstruate during the entire period of lactation. Placental extract, for instance, antagonizing as it necessarily does the glands whose function it is to produce menstruation, may on the same basis be used for certain forms of overactivity on the part of the thyroid, ovary and pituitary glands.

It is more than probable that this placental secretion plays its part in the causation of postpartum asthenia and if this is true, then postpartum asthenia is a gland exhaustion and since the glands most affected are the thyroid, pituitary and adrenals, the theory on which therapy is to be established becomes apparent. It is the whole suprarenal extract which is of value in the treatment of this type of patient. The anterior pituitary is a most important addition.

The treatment of the curable cases of sterility by endocrines depends solely on the trophic stimulation of the various structures concerned in ovulation, transmission of the ovum, and embedding of the ovum; or else in inhibiting those stimulations which expel the ovum; and our brief review of physiology makes the correct application of the appropriate endocrines perfectly clear. Let us remember that the interstitial

ovary differs from the follicle apparatus and true corpus luteum; the anterior hypophysis from the posterior pituitary; the adrenal cortex from the medulla. Possibly within these grosser anatomical and physiological differences in secretion are still finer undefined differences, especially in various periods and functions of life.

The practice of gynecology includes gynecological surgery, obstetrics, and conditions amenable to treatment by what are known as medical methods. But in addition to this there are types characterized not only by somatic signs, but by what are called nervous, neurasthenic and hysterical and psychic symptoms. Women are likely to refer the causation of their general nervous symptoms to the genital tract, and the older I grow the more true I find this to be. Gynecologists have believed this to be the case and have evidenced their belief by the attention paid to the operative correction of abnormalities and injuries; and by the added explanation that through reflex channels these deviations from the normal have produced their injurious effect on distant areas of the body.

Fifteen years ago in an article on "Associated Nervous Conditions in Gynecology," I expressed the opinion that hyperthyroidism, relative and actual, was the most frequent cause in my practice of the nervousness and excitability in patients called hysterical and neurasthenic. Continued observation taught me that we were often dealing with a plus or minus thyroidism and that in a general way the excitable patients were suffering from a thyroid plus condition and the depressed, tired, asthenic patients were suffering from a thyroid minus condition. From this basis further experience showed that pluriglandular involvement was frequent.

Now I have added the element of hyperpituitarism to the former thought of hyperthyroidism in explanation of many of the excitable states, for I find that many of the factors which have directed my attention in this channel point to the pituitary body in explanation of physical and psychic phenomena. Among the points of importance are dysmenorrhea, menorrhagia, fibromyomata, general excitability, lack of obesity,

vasomotor symptoms and symptoms resembling the hysterical. I might refer to *hysteron* from which Greek word is derived the word hysteria. The theory of Freud directed to the study of the sex sphere, physical and psychic, has done much to attract attention to the importance of sex questions and sex experiences as related to the subsequent behavior of the individual. Before passing for a moment to the question of onanism, let me state that I believe that sex phases and the phyche are not wholly matters of cause and effect in relation to the abnormalities of either, but that both are projected from stimulation partly of an endocrine type into the two fields of cognizance and sensation.

Undoubtedly the greatest difficulty in the proper interpretation of interglandular upsets, depends upon the fact that so many of them are of minor degree, of a degree less than is typical of the well exemplified cases. If we have exophthalmic goitre on the one hand and myxedema on the other; gigantism or acromegaly on the one side, certain types of dwarfs or dystrophia adiposogenitalis on the other side; if we have tetany and paralysis agitans contrasting with myasthenia gravis; if we have excessive sexual and physical development due to tumors of the pineal, the hypophysis and the adrenals and *gonads* on the one hand, and cases of undeveloped genitalia and infantile uterus on the other; if we have acromegaly on the one hand and osteomalacia on the other; if we have excessive function and menstruation through oyster ovaries, and diminished function and relative amenorrhea through ovarian hypoplasia and degeneratio-adiposogenitalis; if we have the extreme adrenal disease known as Addison's disease, why may we not expect minor degrees of involvement in the glands or pluriglands responsible for these major cases, the resulting symptoms here often lacking the typical earmarks which define the standard types which we have mentioned?

We must distinguish between the somatic and the mental or psychic side of pathological states due to the endocrine relation. I have seen attacks of mental depression and blues in so many of my patients; so many cases of premenstrual ex-

citement and states of exaltation of minor degree; so many cases where the states vary from slight exaltation to slight depression of a mild melancholic type; cases of puerperal mania that long ago I came to the conclusion that we must grant variations in intensity in mental diseases.

If we have the forms known as manic depressive insanity, dementia præcox, melancholia, and other mental deviations, why may we not have minor types of the same conditions confronting us in our medical, gynecological and obstetrical work? We know of the excitability associated with the various grades of hyperthyroidism; we know of the mental apathy associated with the various degrees of myxedema; we know the mental peculiarities and the changes in character in patients with hypophysis alterations. All of these alterations noted from time to time in my experience have convinced me that mental diseases of extreme type may have the same relation to the milder forms and to the so-called neuroses and psychoses, and to the so-called "neurasthenia" and "hysteria," that the major forms of exophthalmic goitre and myxedema, gigantism and dwarfism bear to minor variations noted every day.

The librarian of a Scotch university once remarked that if all the textbooks ten years old were destroyed little, if anything, would be lost. Moynihan says: "The wealth of teaching in the textbooks represents rather a legacy flowing from one's ancestors than a fortune newly won by hard endeavor."

Endocrinology is making such vast and rapid strides that it promises to overthrow entirely many of the older notions of physiology, pathology and therapy in our textbooks. It is because our knowledge on many points is so indefinite and because our therapeutic endeavors are so groping that every medical man has it in his power to add to our common store of information. New things are always treated with skepticism, but each thinking physician may observe in his practice abundant material for research. By working together we may soon prove beyond doubt that while heredity shapes our ends there is an endocrinity that runs parallel.

A difficult question and one requiring the utmost delicacy in its management is the question of onanism and abnormal sexual practices. The general idea is that onanism is a very harmful and injurious practice, reacting badly on the physical, mental and psychic sides of the affected individual. That it does harm, and grievous harm, is undoubtedly true. Is it, however, a fact that degeneracy, feeblemindedness, and weakness of character are the results of the extremes of these practices, or is it rather that in these types these habits are more frequently observed because of a physical trend and a lack of mental control?

We are confronted with a like problem in the matter of alcoholism. It is certain that alcohol, if persistently used to excess, has an injurious effect on the physical and mental status of an individual. If tainted with a tendency to degeneracy or with a neuropathic habitus, it exaggerates the trend to alcoholism and increases its ill effects; but it is the consensus of medical opinion today that the degenerate and feebleminded person, the hereditarily tainted, are those who exhibit the tendency to excessive alcoholism, and therefore many view alcoholism rather as a symptom of abnormality.

If the ovary, thyroid, pituitary and the adrenals have to do with sex development and with a trophic control and support of the sex organs, it would seem quite natural to expect a hypersensitiveness in this sphere, and a more easy attraction of the mental and psychic attention toward this region in one individual than in another not so stimulated. A rather low stimulation of these organs, or a dominance in the chain on the part of those glands which inhibit this stimulation, would therefore give the opposite effect. Frigidity is as often caused by the endocrines as by the mental attitude.

Sexual inclination is increased or diminished at different periods of life. It may be stimulated by food, by alcohol, by drugs or through various senses. Through the mental sphere and the various senses an exaggerated stimulation may be developed. At the various periods intervening between menstruations sexual inclination varies, it is increased or dimin-

ished in different individuals by compatibility or incompatibility. If disease or tumors of the pineal gland, of the pituitary, or of the adrenals produce precocious sex development, how much further need we go to come to a more rational conclusion concerning the points just discussed? This conclusion is based more on the theory of an unrecognized endocrine urge than we have heretofore believed possible.

We do not propose the idea that normal man is not responsible for his acts. I do not propose to put the responsibility upon the endocrines for all his reactions to external stimuli and to environment. Instincts, emotions, education, the study of high moral standards, the teaching of self-control in various ways, the element of duty in relation to one's family and as a protection to one's self, are all factors which develop a higher psychic sense of control. These points, together with the element of judgment, distinguish the normal from the lower grades of human beings and from animals; but to say that control in any of those factors that dot the human line is as easy for one person as for another (even granted that they have the same parents and the same training) is to say that which is distinctly not true; for it is not true that all men are created equal in instinct and potentialities.

Some persons are born with instincts so good that nothing can make them bad; others are born with instincts so bad that nothing can make them good; but the vast majority of people are fairly normal, with a leaning toward one or the other side, according to their endocrine stimulation, their emotions, their education, training, environment and accidents of experience. Change the words good and bad to any other adjectives implying opposite meanings, and a like statement holds good. We may say of people, bright or dull, energetic or lazy, conservative or radical, excitable or placid, irritable or phlegmatic, thin or fat, sweet tempered or sour tempered, or any of the other adjectives used to describe characteristics.

Some people are born with so stable an endocrine relation that nothing will alter the normal interaction of the endocrine glands; others inherit or acquire endocrines so unstable or

deficient that nothing can elevate them to the threshold of the normal. The vast majority of people are born with a fairly stable endocrine system and with instincts capable of being affected for better or for worse by the influences and accidents and infections of life.

The relation between the various endocrine structures is less stable in woman than in man. There are many disturbances during the period of development and the establishment of menstruation. Menstruation itself is a constitutional phenomenon, associated with loss of blood, often with dysmenorrhea, often with severe premenstrual phenomena. Pregnancy, while it acts as a tonic in most cases, in many instances puts too great a strain on the endocrine chain. Miscarriage, while well borne even when repeated in many instances, is in other instances productive of lasting harm to the ovaries. Inflammation affecting the uterus and the ovaries may have an important bearing on an endocrine upset. The same holds true of uterine displacements because of the involvement of the ovaries. The hypophysis changes in pregnancy are latent possibilities of future troubles.

Tumors of the genitalia, whether they are the result of endocrine aberrations or not, are certainly associated with inharmonious action of associated glands. The change of life phenomena, profound as they are in many instances, are an evidence of the inherent instability present in many women. In a goodly number of women there is a normal readaptation but it is at this period that previously latent weaknesses rise to the surface. The psychic effect of the various happy and unhappy complications of life are not to be underestimated. Because of these possibilities woman is called the weaker sex. It must be granted, however, that in the largest proportion of cases she does mighty well to hold her own. Whatever we may say about thyroid affections it is a fact that this gland is involved eight to ten times as often in women as in men. The influence and activity of the endocrine glands are evidenced by the stimuli and the changes produced on the body, the nervous system, the emotions and the psyche. In some in-

stances abnormalities of gland activity are characterized by physical stigmata; in others, by changes in the activity of organs whose function is continually under the influence of the nervous system. In still other individuals, abnormalities of gland activity are evidenced by changes in the psyche; and in some, combinations of various forms are in evidence.

When events, occurrences, etc., which act on the instincts and arouse emotions do prompt a response, there is an endocrine activity which varies in degree and in the gland involved according to the instinct and emotion affected, and this particular endocrine, or endocrines, act as fixers in association with the thyroid.

A distinct neuroendocrine path is created by every stimulus through any of the senses. Any event, process, or stimulus which has brought into activity any endocrine secretion specifically associated with the emotion aroused, may be recalled, or the recall is made more easy by a subsequent activity of that endocrine. This constitutes what might be called reverse peristalsis, and plays the all-important part in dreams, and in determining the character of the dreams.

If a little child three years old, before retiring, is aroused into a tempest of anger by anyone and a few hours later that little child in its dream shows the emotion of anger and cries out the name of the person responsible for the emotion, how are we to explain this phenomenon? What more logical and correct explanation can we give than that the adrenal outpouring associated with the emotion of anger has continued its activity during sleep and has reawakened the subconscious sphere and in part the upper sphere, to a reproduction of the original picture? Considerations like these should make us regard the bedtime hour of children as the hour of their greatest happiness. If certain fairy tales and stories that unwittingly rouse fear were banished entirely from the lives of children the adult would have fewer phobias, fears, and anxieties.

If we can fathom and understand what the ductless glands have done to an individual, born with instincts and emotions, up to the stage of puberty, we may better appreciate why the

individual develops as he does; if we can reason out what these ductless glands have done to that individual, with instincts and emotions, from puberty up, we may better understand why that individual is what he is and why so many changes have occurred in him; if we can eventually fathom what hereditary or accidental and intercurrent factors are responsible for his endocrine relations and for the consequent emotional, systemic, mental, and psychic factors, then medicine will have achieved a glorious work. And when we finally realize that the emotions act on the endocrines and that the endocrines influence and produce emotions much that is mysterious will seem simple.

I should like to warn against the tendency to prescribe definitely combined formulæ in tablet or other form, when such combinations are recommended as the correct therapy for certain and many of the conditions now known to be due to endocrine abnormality. The physician then loses touch with the theory and explanation of the innumerable pluriglandular states and the study and analysis of all the factors entering into diagnosis are neglected. In the past this has been a serious hindrance to accurate diagnosis and to the proper interpretation of the therapeutic value of the drugs entering into many of the combinations. The physician ought not to further the habit among the laity of taking drugs of any sort except on medical advice, for if he does anything to foster this habit he will be more and more looked upon as a man needed only for advice and help in those states and conditions which the public feel they cannot correctly diagnose and treat alone.

CHAPTER VI

HYPERGENITALISM AND HYPOGENITALISM

Hypergenitalism (Pubertas Praecox)

The somatic and psychic characteristics of puberty are dependent to a great extent upon and evidenced by the maturity of the genital glands.

Premature puberty includes accelerated ossification. Skiagrams show a rapid approach of epiphyseal ossification to the stage when the synarthroses close. This finding is in accordance with that of psysiologic puberty, for, in the latter condition, proliferation of the epiphyses soon ceases. Gigantism, on the contrary, is characterized by persistence of epiphyseal synarthroses and by the abnormal height to which this leads (Biedl).

The most important point in regard to the etiology of pubertas præcox is whether or not the condition is primarily the outcome of precocious development of the genital glands. Hypergenitalism and pubertic precocity may be primary or else the secondary results of the primary affection of other glands. This applies to cases in which tumors were present, either in the suprarenals, in the hypophysis, or the pineal glands.

Hypophyseal overactivity is frequently associated with gigantism, although generally with genital atrophy.

Cases of pineal tumor show abnormal growth in height and premature genital and sexual development and corresponding mental precocity.

The presence of suprarenal tumor in sexual precocity is remarkably frequent. There is exceptional development of the body, obesity, physical precocity, the habit of sexually mature persons, extreme hypertrichosis.

If we exclude such observations, a large number of cases remain which cannot be explained otherwise than by primary hypergenitalism.

The genital glands have a great effect upon the growth of the skeleton. Experiments show that in man as in animals

castration is followed by excessive longitudinal growth, a lack of proportion between the length of the extremities and that of the trunk, and persistence of the epiphyseal synarthroses beyond the normal age.

Protracted epiphyseal separation may result, not only from the operative removal of the generative glands, but also from hypoplastic subdevelopment of them. The presence of this symptom, in combination with the persistence of other juvenile traits, is described as immaturity of the organism or eunuchoidia. These cases do not altogether fall into the group of pathologic conditions classed as infantilism, for infantilism is characterized by the small size of the skeleton and its infantile proportions; i. e., long trunk and short extremities. Hypoplasia of the genital glands is presumably accompanied by symptoms analogous to those of suppression; i. e., abnormal longitudinal growth, especially in the legs, and considerable increase in the fat of the body. Thus, the only true cases of hypogenitalism would be those of infantile gigantism, which are characterized by abnormal growth of the long bones, imperfect secondary sex characteristics, and deficient mental development, and in which testicular atrophy and the absence of any signs of pituitary disease justify the assumption of primary hypogenitalism. (Biedl.)

The age in which genital maturity takes place has a paramount influence upon the growth of the skeleton. The effect of late maturity, like that of genital hypoplasia, is to increase the height, especially the length of the legs, while early maturity brings about premature closing of the epiphyses, and is consequently associated with shortness of the legs. Inhabitants of warm countries are generally small of stature. These results are to be attributed to early sexual maturity.

There is intimate relationship between the development of the skeleton and the internal secretory activity of the genital glands. The genital glands elaborate a hormone, which stimulates the processes of ossification. Castration is followed by changes in the thyroid, thymus, adrenals, and hypophysis, and the removal of these organs produces changes in the struc-

ture of the genital gland. It is, therefore, very difficult to estimate the extent to which the skeleton is directly influenced by the genital glands, because the thymus, thyroid, adrenals, and hypophysis all effect the growth of the bone, their combined influence being complicated; in part antagonistic, in part co-operative.

Hypogenitalism (Sexual Infantilism)

Infantilism includes a group of variations which differ very much, but which include various degrees of retardation of development. In addition to that retardation which affects certain organs, or which affects certain systems (such as the osseous system, the cardiovascular system, or the nervous system, or the sexual organs, or which constitutes a general retardation of development), there is the retardation which is functional rather than organic. An arrest of development which affects the mass of the individual may result from various causes, from infections, such as infections of the cardiac or arterial systems. A normal development may be inhibited by transmission of hereditary faults, or by errors of hygiene during infancy and early childhood. Infantilism may result from anemia and chlorosis, from tuberculosis or lues, or from intestinal conditions, as mentioned by Herter.

Infantilism includes alterations in the osseous system, such as slight body development, gracile bone development, deformities of the skull, hypoplasia of the jaw, irregular tooth development, and the various degrees of skeletal undergrowth. There results delicacy, smallness of the body, and the individual is an adult in small mold.

Infantilism has been considered an anomaly of development, in which the general morphologic characteristics belonging to infancy persist in a subject who has passed the age of puberty. Thus infantilism formerly signified a persistence of infantile characteristics. This view included other elements in addition to stature, and to the element of skeletal undergrowth was added variations in the development of the generative organs of the degree of sexual dystrophy.

Today we are inclined to consider under infantilism a retardation of development that may begin at any age, and results in the persistence of the physical characteristics that exists at the age of its onset. It means that development remains stationary at a stage which a normal individual of the same age has long passed. This unripeness, just as it may affect the entire organism, may also affect only certain organs (infantilismus partialis) or certain organ systems, or else it may affect the entire organism (infantilismus universalis). Development of any organ concerns a differentiation in external and internal form, also a change in size, also a change in position, so that an inhibition of growth may concern the form (horseshoe kidney), size (narrow aorta), or position, undescended testicle (cryptorchism).

Though a retardation of development may manifest itself in a retardation of development of the osseous system or the nervous system, or the cardiovascular system or the sexual organs, it does not, by any means, affect equally all parts. Infantilism may also signify retardation in functional development, and this may be general or confined to certain systems, or may be local; hence, asthenia universalis congenita is a functional form of infantilism, as is visceroptosis, so is flat-foot, and so are other forms of asthenia.

Many of the pictures under the heading of Infantilism have been such as resulted from the effects of hypothyroidism.

Hypothyroidism inhibits the growth, especially of the long bones, associated with which is the tendency to become more stout and plump. There are changes in the growth of hair; there is enlargement of the abdomen, diminution of the temperature, there is a mucoid edema of the subcutaneous tissue, atheromatous changes in the aorta; there is genital hypoplasia, sterility, and idiocy. These are observed where, in animals or human beings, there is a complete defect of the thyroid. These changes are especially noted in absence of the thyroid in young animals still in the early periods of growth. In older animals the changes are less marked. The animals then show apathy, trophic disturbances of the skin, alterations

in digestion, loss of weight, anemia, *and a disposition to infectious diseases,* to which they readily succumb. The genital functions are diminished.

The same changes occur in human beings after removal of the entire thyroid. This is the so-called cachexia-strumipriva. A further symptom of this cachexia is a diminution of the mental energy, of the energy for work, and a typical edematous swelling of the skin. The skin is dry through a diminution of the perspiration, the hair falls out, the patients look old and stupid, the red blood-cells are diminished.

In congenital myxedema there is a decided inhibition of growth. There is obstinate obstipation, psychic disturbances, and a marked inhibiting effect on the sexual organs. In the congenital absence of the thyroid and in the infantile cases of atrophy of the thyroid (which atrophy develops in the fifth and sixth years), the large majority of the cases are found in female children. Myxedema in adults is more frequent than infantile myxedema. At that period 80 per cent. of the cases are in women. Here anomalies in the function of the female genitalia are frequent. Amenorrhea is frequent, but menorrhagia also occurs; in many cases the genitalia remain normal; in other cases a decided *atrophy* is found.

Infantilism is probably always the result of alterations or deficiency in glandular functions. It may result from the so-called status lymphaticus, where fatty marrow is present instead of red-bone marrow. It may result from persistence of the thymus, insufficiency of the thyroid or faulty secretion of the suprarenals, or pancreatic insufficiency, or deficiency of the hypophysis or ovaries, or chromaffin tissue.

Involution of the thymus coincides normally with adolescence. There may, however, be the so-called persistent thymus. The thymus exercises an inhibitory influence upon the development of the ovaries, and involution of the thymus is consequent upon the maturity of the sexual glands. Individuals with hypoplastic ovaries retain the thymus longer than normal. In this form of status thymicus there is a question whether the thymus is in direct relation with the genitalia,

or whether both are not a symptom of a slow development. In the status thymicus there is a general enlargement of the lymph-glands, of the tonsils, of the follicles at the base of the tongue, enlargement of the spleen, narrow aorta, large, pale, soft heart. (Biedl.)

If with infantile signs in the body there is genital hypoplasia, with late menstruation, narrow pelvis, large tonsils, possibly slight Basedow symptoms, we must always think of the "status lymphaticus."

Vascular hypoplasia, with narrow aorta, may be present with or without chlorosis. In vascular hypoplasia anomalies of genital functions may occur. Menstruation develops late, there are various forms of dysmenorrhea or amenorrhea, though occasionally there may be bleedings at puberty. When genital and vascular hypoplasia exist in the same individual, they must be considered as co-ordinated results of a general disturbance of development dependent on the endocrines.

Absence of or alterations in the internal secretion of the ovaries may be the cause of infantilism. The type varies according to the period at which changes occur. Castration of young animals arrests the development of the genital organs; castration of adults changes only the secondary sexual characteristics. Therefore, infantilism may be a regressive change, occurring after atrophy of the ovaries. Atrophy of the ovaries may be secondary to affections of the hypophysis and thyroid and adrenals. Involvement of the hypophysis causes a typical type of infantilism, with a disappearance of the sexual characteristics. The size of the individual should not lead to wrong conclusions, for early development of the ovaries causes early ossification, and so limits the height of the individual, while absence or late development may delay ossification, and cause increased length of the lower extremities. The secretion of the ovaries assures the development of the genital organs and the appearance and the continuation of the secondary sex characteristics, so that congenital or early involvement of the ovaries may prevent the development of the secondary sex characteristics.

Hypoplasia of the ovaries may represent only one of the symptoms of a constitutional anomaly for which it is not responsible. This is not infrequently found as a part of a general condition in patients who have a tendency to enteroptosis, movable cecum and sigmoid, a lack of fat on the large labia, a large distance between clitoris and urethra, narrow, short vagina, a lack of well-developed fornices, malposition, rudimentary uterus or infantile or fetal uterus (cervix longer than the corpus), various degrees of double or divided uterus, small ovaries, narrow pelvis, persistence of fine hair on the lips, and diminished trichosis of the axilla. There is frequently dysmenorrhea. There is often fluor albus. There is a tendency to vaginismus, often sterility, and a resulting phychic depression. There is decided asthenia.

"The interrelation between the hypophysis and ovary is very intimate. Cases show imperfectly acquired secondary sexual characteristics when the hypophyseal lesions antedate puberty, and a resultant amenorrhea, with retrogressive sexual changes, when the malady develops after adolescence. As a result of preadolescent castration, reproduction is impossible and the acquired characteristics of sex fail to appear. In the ovary there are two, and possibly three, glandular elements, the gland of ovulation, the interstitial cell body, and the corpus luteum of menstruation and of pregnancy. The reproductive function may not be impaired, even though full secondary sexual characteristics have not been acquired. The secretory element of the ovary, which is responsible for the physical changes of puberty, is probably the interstitial body, and differs from that which is concerned with ovulation. The relation of hypophyseal disorders of overfunction or underfunction to physiologic activities of the ovary, *other than those concerned* with the acquirement of adolescent characteristics, is very close, and amenorrhea is an early symptom, with marked overfunction or underfunction."

When hypopituitarism of the anterior lobe dates from the adolescent period there occur other changes than failure of full development of the long bone. There occurs in the

male a feminine disposition of the adiposis, the males possess a feminine type of skeleton with broad pelvis, there are small and delicate extremities, there is the tapering type of hand. In hypopituitarism there is a certain undefinable facial resemblance, due to maxillary prognathism, while in acromegaly there is mandibular prognathism.

CHAPTER VII

SKIN AFFECTIONS AND THE INTERNAL SECRETIONS

The thyroid, the adrenals, the ovaries, the hypophysis, and the other glands act to some extent in harmony, to some extent in opposition, to each other. In diseases one may take up the function of the other, or they may all unite in a common action against certain products, some or all may be affected in like or varying degrees by infections or by toxic substances.

Politzer's conclusions are of great interest and are substantially as follows: Certain involvements of the skin occur during pregnancy and disappear on termination of pregnancy. There are certain dermatoses of puberty, of menstruation, of pregnancy, and of the climacterium. Some of the skin annoyances of pregnancy may depend on the cessation of ovarian function and the cessation of menstruation during that time, or they may be due to the influence of the corpus luteum or of the placenta or the pituitary or the adrenals.

At puberty there is a great change in the skin; there is a special increase in the adipose tissue characteristic of the female; there is a growth of hair in the pubic and axillary region. Acne may be considered as related to the sexual apparatus only in so far as the establishment of puberty physiologically brings about local circulatory changes in the skin of the face, which renders the latter a more favorable soil for the development of the special micro-organisms of acne.

The regular monthly hyperemia of menstruation may occur in any part of the body, and cause dilation of the blood-vessels in any part of the body, may cause changes in any of the skin diseases, or altered skin conditions, which are present in face and elsewhere. Simple erythema and the various forms up to erythema nodosum may occur regularly before, during, or after menstruation, and are often associated with menstrual irregularities. Cases of purpura in connection with menstrual irregularities may be regarded as due to pathologic processes

in the skin of a more intense nature than those which cause erythema.

Urticaria and angioneurotic edema may be related to menstruation. Menstrual urticaria may appear at regular intervals with each monthly period; in other cases it occurs only with menstrual irregularities, such as amenorrhea. The angioneurotic edema not infrequently occurs in definite relation to menstruation; they may be anaphylactic phenomena. The most frequent skin disorder related to menstruation is herpes. One woman in twenty suffers from frequent or habitual menstrual herpes, occurring on the external genitalia or in the sacral region or the face, especially the lips.

Hypertrichosis (excessive development of hair), more or less over the entire surface, but especially in the face, is pathologic; it is commonly associated with ovarian disorders and is due to the adrenal cortex and the anterior pituitary. Disturbances in the function of the ovaries produce changes in the suprarenals and hypophysis. Temporary cessation of ovarian functions during pregnancy causes increased secretion of the hypophysis and adrenals. Hypertrichosis has been said to be due to the excessive function of the hypophysis and adrenals. Hypertrichosis of puberty, the hypertrichosis of ovarian disease, and the hypertrichosis of the climacterium are due to inadequate glandular ovarian secretion acting in this manner.

Hyperpigmentation at puberty, during pregnancy, and with ovarian disease is not infrequent. Chloasma gravidarum occurs in three-quarters of pregnant cases. It is possible that the placental secretion produces secondary changes in the function of the adrenals.

Herpes gestationis is a severe disease, characterized by an eruption of more or less extensively distributed grouped lesions, made up mainly of vesicles and bullæ accompanied by intense pruritus. The disease is dependent on pregnancy, and promptly disappears when the uterus is emptied.

It was formerly suggested that the pruritus, urticarias, and dermatitides of pregnancy are due to the same agents that cause hyperemesis, nephritis, hepatitis, and eclampsia; namely,

anaphylaxis brought about through absorption of foreign proteids from the placenta. Endocrine changes are involved in all these conditions. Some cases of dermatoses in pregnant women have been relieved by the injection of 20 c.c. to 30 c.c. of serum from the blood of healthy pregnant women.

The dermatoses of the climacterium, so far as they are related to the genital system, are of the same kind and nature as those occurring with anomolies of menstruation and are dependent on altered endocrine secretions. At any rate "reflex" has nothing to do with these cases of skin involvement.

CHAPTER VIII

PUBERTY AND CLIMACTERIUM

Up to and before the period of pubescence the glandular or follicular portions of the ovary have not been active as far as menstruation is concerned,—at least not as a rule. The interstitial and glandular ovaries have, however, been performing some of the functions which are related to the development of the secondary sex characteristics, the most noticeable of which characteristics are the future mammary glands. If we at this time compare the frame, outline, and typical locations of fat distribution of the boy and girl we see differences sufficiently marked to realize that they, as well as the differences in tastes and emotions, are due to the fact that the ovaries in the girl and the gonads of the boy must be,—as they are,—among the responsible factors and that these differences have occurred through the medium of the ovaries on the one hand and the testes on the other. Up to this time, too, pineal gland, the hypophysis, the para-thryroids, the thymus, the thyroid, the adrenals, etc., have been contributing their internal secretions, making and moulding the child's body, visceral, and sex structures, and,—what is not least in importance,—the mind or psyche.

The anterior pituitary is especially related to the growth of the frame, of muscle and the development of the brain; the posterior pituitary is particularly related to the development of the sex organs, muscular structures, and to metabolic processes, etc.; the thyroid is the great activator; and the normal action of the thyroid is of the greatest importance in promoting those trophic and nutritional changes in the brain which lead to the development of a good mind, good memory, etc. An under-activity of the thyroid is responsible not only for retarded physical growth and for the various degrees of myxodema and cretinism in children, so often seen but, in the absence of all physical manifestations of a marked character, it is responsible for mental sluggish-

ness, for inertia, for lack of energy. Such children tire easily over physical or mental work, are sleepy or slow in their movements, they yawn over their school work, they get up late and dress slowly, and are quite different from the normal, healthy, active child, anxious to go about its work. These children are scolded and called lazy, stupid, "fat-head," when all they need is the recognition of the condition and the administration of thyroid extract or pituitary anterior or suprarenal extract in small doses.

The hyper-thyroid child is over-stimulated, over-energetic, often extremely excitable, readily irritated. So is the child with excessive action of the adrenal medulla or of the posterior pituitary.

The adrenal function is of the greatest importance during this period of development, not only because it is essential to good health, but because it acts on the development of the sex organs and is of tremendous importance in determining the reactions of the child as expressed by its emotions. An under activity of the adrenals is responsible for languor, tired feeling, asthenia. It is ofttimes hard to determine whether we are dealing with a diminution of adrenal secretion or a diminution of thyroid secretion, or a diminution of other secretions in combinations,—or whether one, two, three, or more glands are deficient at the same time. But the adrenal function is of the greatest importance at all periods of life and its workings should be especially studied in children and in the young because it seems to be beyond the possibility of doubt, markedly related to the emotions of anger and fear; and of all the detrimental influences of life, especially in the life of the child, the element of fear plays the greatest part.

Some children are not easily frightened; others are more readily frightened, and others are of an extremely fearful or fearsome nature; and to call these neurotic or psychopathic, and to say that they have inherited these conditions may be only too true, but it explains nothing which the parents can understand and hope to correct; nor do these terms imply in the least that the physician recognizes that there is something

wrong which may be corrected. The parents must and should do everything with all children to avoid inculcating fear, and should remove any element of fear as much as possible from the mind of the child; at this age fears, though not remembered as having been experienced earlier, may persist as sensitive paths and continue throughout the whole life of the affected individual.

The adrenals consist of two parts, the cortex and the medulla. The medulla,—which gives us adrenalin,—responds to a stimulus associated with the emotion of fear, and the medulla plus the cortex responds to the emotion of anger. It is the adrenal cortex response which changes an emotion calculated to be expressed by fear into an emotion expressed as anger. Therefore children with a badly balanced adrenal system, whereby the medulla area responds to stimuli without a corresponding response on the part of the cortex, are the children who are afraid, fearful, excitable, and nervous. Therefore in young children, slow growth, slow mental development, lack of energy, may be dependent upon the failure of proper activity on the part of the pituitary, or the thyroid, or the adrenals, or upon a combination of these; and the over-excitable, nervous, neurotic, masturbating, easily frightened children may have too much stimulation by the thyroid, too much stimulation by the adrenal medulla, or by the post-pituitary, or by all. Of course the thymus and especially the parathyroids are of the greatest importance.

Among these glands the thyroid is associated with the development of the genitalia; so is the pituitary; so are the adrenals; and if these glands which are associated with the development of the genitalia should at any period overact along these lines the child is unconsciously affected and feels a sense of attraction toward the sphere of the organs which are stimulated. This is the explanation for the slighter or greater tendency to what are called manipulations by the fingers of the organs known as the genitalia. This is frequently only a passing phase, manifesting itself at different periods of life, according to the degree to which the endocrine system is stimu-

lating the growth of these structures. It may occur in the early years; it may occur during the period preceding the onset of menstruation; or it may occur at any later period of life.

The thymus gland has a tremendous effect on the type of the physical and bony growth of the individual. It also stands in relation to the development of the sex organs. Its physiological retrogression takes place in the early years, previous to which time it has inhibited too early development of the sex structures, and so permits the sex organs to begin or continue their proper growth. Hence the too early removal of this inhibition starts an early development of the genitalia, related as they are and dependent as they are for their trophic support on the ovary, the pituitary, the adrenals, and the thyroid. A too late removal of the thymus from the sphere of activity inhibits the development of the genitalia and likewise must interfere with that normal phase of the pituitary, thyroid, and adrenal activity which is exerted on the genital sphere. In conjunction with the thyroid and the other glands, the thymus and the parathyroids are likewise concerned with calcium and bone metabolism, and so the type of body form and bone development may be markedly influenced by a persistent thymus action or by too early removal of same.

As the ovaries begin to show the added secretory power, which results eventually in menstruation and ovulation, a relatively new secretion, the corpus luteum, with added power of the interstitial area also is brought into the circle of endocrines, and all of them are now concerned with the development of the body, mind, sex organs and sex functions,—from puberty, through adolescence, to adult life.

We might imagine a family of, say ten, acting harmoniously and in concert for years. We might then picture a new member introduced into this family circle. If he fits in well with the other ten and their relations are harmonious, there is a peaceful, contented, stable relationship, since they all act in concert. But if the new member is not in harmony with the other, and is arrogant and dominant, an element of irritation and stimulation is introduced which will rouse and irritate

all the others; or irritate some and depress others, and there is a resulting lack of harmony and co-ordination.

So it is with the action of the endocrine chain at the period of puberty and on through adolescence. The more stable and harmonious the activity and inter-relation of the other endocrines, the more does the girl develop her menstruation without annoyances and the more certainly does she go on through the next succeeding years with little or few untoward manifestations. The more unstable or easily affected is the endocrine chain, the later and more irregularly does menstruation develop with pain and discomfort; and the more are the other glands over-stimulated or under-stimulated, with a resulting sense of nervousness, instability, asthenia, excitability, and all the other terms used to describe the unfortunate adolescent young.

If there is a marked hyperthyroidism, the girl will suffer from tachycardia, palpitation of the heart, excitability, and nervousness at various times. If there is a hypo-thyroidism, the opposite is to be expected and will surely be noted.

If there is an excessive action of the posterior pituitary, she will suffer from dysmenorrhoea; her tenderer emotions are more easily aroused, blushing is noticeable, and the sex feeling, —vague though it may be,—or the sex instinct is more pronounced. Psychic fears are more evident.

If, on the other hand, the posterior pituitary is underactive, there may be no pain at menstruation, the menstruation may be scanty, and the girl is liable to be stout or adipose,—totally different in many of her functions and appearance from the girl with posterior hyperpituitarism.

If there is a predominant stimulation of the adrenal medulla, there will be nervousness, irritability, sensitiveness, blushing, fear, anxiety, etc. If the adrenal cortex is overstimulated, the girl will show some of the characteristics of the male in the way of courage, absence of fear, decided fondness for manly sports and, though feminine in other ways, may be less sentimental.

All these innumerable variations of interglandular relations, and they are almost limitless, give us such a variety of symptoms and types of girls that there can no longer be any attempt to apply terms to any of them except as they apply directly and specifically to each and every individual viewed as an independent entity.

The girl at school or college with a good thyroid and a good anterior pituitary is not only studious and bright but has a more mature type of mind and is more settled than is the child with a good thyroid but a poor anterior pituitary. The latter may be happy and gay or excitable, may have admirable qualities in other ways, but she lacks the studious, sedate, and settled character,—the lack of which, however, is by no means to be considered a disadvantage at this time. And so girls at the school and college age manifest different tastes and likings, varying emotions, varying dispositions, according to their endocrine make-up; and it is essential for parents and educators to understand these facts, for it is absolutely true that while education, training, and environment have a most marked effect on the emotions, disposition and character, the endocrine make-up and the endocrine activity, and the endocrine inter-relations are the decisive factors.

Therefore this period of puberty and adolescence, or rather the entrance upon this stage of puberty is as much a change of life for the growing girl, leading up to and preparing her for the activities of the next thirty years, as is what the laity call the "change of life" which occurs most frequently in the late forties; and the parallel between the symptoms at this stage and the symptoms at the later "change of life period" is most marked. But here we are dealing with the excitation of activity of these glands, whereas at the climacterium we are dealing with the stage of retrogression. And very often, as the woman goes into this adolescent period peacefully or calmly, or upset and disturbed, so she may go out of it in the same way.

It must be remembered, however, that this would be more uniformly true were it not for the innumerable factors and

complications of the period between adolescence and the true change of life,—for here come in the questions of marriage, childbirth, miscarriage, nursing, operations, infectious diseases, fortunate and unfortunate environment, happiness or unhappiness, mental shocks and worries, the responsibilities and cares of motherhood, all of which contain vast possibilities in the way of a fortunate or unfortunate effect upon any one of the important endocrines or on the whole system.

Some endocrine chains are so stable that none of the above mentioned factors disturb them or effect them permanently. Other chains are so sensitive or unstable that they are more or less profoundly affected by what often appears unimportant. Certain families are characterized by marked stability of endocrine relationship, and in many families one or other of the glands is so dominant that it characterizes practically every one of the descendants for generations, for either good or bad. Therefore marked mentality and stability of character, probity, and high sense of morality characterize certain families for generations,—nervousness or irritability, or a tendency to "neuroses" and "psychoses" and varying degrees of what are called emotional states may characterize other families.

If, for instance, the pituitary is the dominant gland, a vast majority of the descendants for generations may be of tall or powerful stature, or of strong able minds,—though it is to be well understood that intermarriage with other endocrine types is liable to modify this type of ascendancy. If a family is characterized by pituitary instability, the father or mother may be acromegalic in body type yet some of the children may show evidences of over-activity of the anterior pituitary, while others show evidences of under-activity. If thyroid instability is the characteristic, some of the descendants will lean toward a hyperthyroidism or various grades of Basedow's disease, while others will tend toward hypo-thyroidism or various grades of myxedema. Families characterized by hypersensitiveness and overactivity of the posterior pituitary, the adrenal medulla are likely to show "neurotic" types and various grades of psychoses and neuroses. Accordingly, if we

could have the photographs and the history of our patients' ancestors we would find every normal or abnormal state dependent upon endocrine activity to have been inherited, though often in forms apparently unrelated, but actually, as our knowledge grows, due to the same endocrine aberrations.

The period of regression, at what is known as the climacterium, means a rearrangement of the gland activities, a going down hill, as it were, since the function of child bearing is passing. The ovary is supposed to pass out of the sphere of action just as at puberty it entered into a new sphere of action; and if the other glands regress in equal and parallel ratio and the inter-relation between the glands is preserved, then the individual goes through this trying period with few if any manifestations of an annoying character. But if the rearrangement is not a normal or stable one, if some of the endocrines regress more quickly than they should and others more slowly than they should, or if only the ovarian activity regresses and most of the others do not, we have all the innumerable possible variations and symptoms due to hyper-activity or hypo-activity, or combination of hyper and hypo, involving the anterior lobe of the pituitary, the posterior lobe of the pituitary, the thyroid gland, the adrenal cortex, the adrenal medulla, the ovarian interstitial gland, and the ovarian follicular apparatus. Of all the gland anomalies at this period overactivity of the posterior pituitary is productive of the largest number of physical and psychic abnormalities.

The flushes which are associated with the menopause or climacterium in many patients are due to absence of the secretion of the ovary which in conjunction with the posterior pituitary (for these two glands are practically sisters in the family) preserves a normal vasomotor balance. If the ovaries regress or are removed and the post-pituitary persists in its former degree of activity or its activity is increased, then the flushes are extremely marked. If the adrenal medulla is over-active the flushes are still worse. The administration of ovarian extract and ovarian residue therefore helps many patients and cures some, but does not cure all by any means.

This is due to the fact that the pituitary, freed of its association with the ovary, and the adrenal medulla are responsible for the flashes or flushes, and unless to the ovary be added some gland extract which inhibits and holds the posterior pituitary and adrenal medulla in check, only a certain amount of benefit will result.

There is a difference between the term climacterium and the term menopause. Menopause means a cessation of the menstruation; the climacterium means the period of transition from the most active thirty years of a woman's life to the subsequent period of peace, quiet and freedom from menstruation and its associated annoyances. A woman may be in the climacterium period and menstruate normally or even excessively. She may therefore have some or other of the "change of life" symptoms long before menstruation ceases, and the annoyances may persist for months or years after the menopause. It is most important to recognize this all too true state of affairs, for only then can a proper interpretation be made and proper therapy instituted. And after the menopause and climacterium are passed there are still possible the various hyper and hypo annoyances involving the endocrine chain, and therefore this is the period when marked neuroses and psychoses (due to the endocrines) may develop, just as during the adolescent stages there are various neuroses and some of the psychoses,—the most important of the latter being dementia precox.

One all-important observation should not be left out of consideration, for it is a most valuable aid to diagnosis at any stage of the active period of life,—the way the patient reacts a few days before each menstruation. This is a sign post indicating which one or more of the glands is sensitive to over or under stimulation. Many girls and women never know before each period that they are to menstruate; others suffer from physical pain; and many suffer from nervous and psychic reactions of a character unusual to them in the inter-menstrual period. A girl or woman may be perfectly well for the three weeks following menstruation and then for a week, or it may be for only a few days, may be depressed or excited, irritable

or extremely nervous, restless, "crazy," as some describe it, full of restless energy at this time, though calm, peaceful or even lazy at others. Here it is our obligation and duty to put our finger on the gland or glands which are over or under working, for such symptoms point to an instability in the chain, and no physician should neglect to characterize these symptoms as of the greatest importance not only for the therapy to be instituted but as indicating the latent possibilities for subsequent magnified upsets of this or other glands. The one thing which medical men, and especially the gynaecologist and also the physician who treats children and young girls, must do is to remove from his vocabulary the words "neurotic," "neurasthenic," and "hysterical," for they are only cloaks for ignorance and make a very bad impression on the parents and on the child or girl concerned. Practically all these types cover deviations due to the endocrine aberrations, and if treatment were instituted sufficiently early, especially during childhood, and more attention were paid to stimulating body and mental growth by endocrine therapy and to correcting states of excitability, fear, etc., by the same methods, the effect on the succeeding years of the affected individual's life would be so markedly for the better that I am sure the future will find us astonished at the possibilities of such therapy during these vital and all important years.

CHAPTER IX

THE "HIGHER UP" THEORY OF STERILITY IN WOMEN AND ITS RELATION TO THE ENDOCRINES

The idea that dilatation and curettage represent the correct, accepted treatment for sterility in women, remains fixed in the minds of many members of the medical profession, probably furthered by the determined and settled notion on the part of the laity that at least this factor in medicine is beyond controversy. It is unfortunate that this practice should continue, for the harm that a dilatation and a curettage may do when an inflammatory condition, often unrecognized, is present, needs no further elaboration. Among the sterile cases over one-fourth prove to have tubal and ovarian inflammation. On the other hand, when no inflammation is present, curettage seems ridiculous when the female is not at fault. Patients are subjected to operative procedures without adequate preliminary examination, for they not infrequently come to me after some cervicouterine manipulation, when subsequent examination shows the male element to be defective or absent. If the male side is not at fault, curettage may have a harmful and injurious influence on the menstrual function and on the ovaries, since the interrelation between the endometrium and the ovaries, trophically considered, is in many instances a delicate one and resulting degrees of amenorrhea are often noted.

The vagina and the cervix, because of the ease of approach, readily attract attention as the factors responsible for the sterility and the "higher up" points are left totally out of consideration. Stress is often laid on an acrid or acid discharge because of its supposed injurious effect on the activity of the spermatozoa. I have not been able to verify this contention except when it is a part of an inflammatory condition. The posterior fornix is supposed in many instances to be at fault when it does not form the normal sac into which the

cervix may dip, since, by allowing the spermatic fluid to run out, the probability of impregnation is diminished. I have learned to attach little importance to this matter likewise.

Quite another matter is the question of cervical catarrh. In a woman who has never been pregnant, a chronic, thick, yellow, greenish, tenacious cervical discharge means an obstruction which no spermatozoon may pass. If this were the only obstacle it might not be so insurmountable in the course of time, but the inflammation is not situated in the cervix alone. In other cases erosions are present as a result of inflammations lasting for months or years and in many instances this inflammation has extended upward through the endometrium into the tubes in varying degrees. That one can, in many cases, by no means definitely exclude an inflammatory tubal or ovarian involvement goes without saying. We find the lesions often graver than diagnosed by bimanual examination and not rarely we find them of a lesser degree of severity.

The interstitial area of the tube may be involved by inflammation and the remainder of the tube be normal. Salpingitis consequent on an appendix attack and slight unrecognized degrees of tuberculosis must be taken into consideration. This type of case, where only the inner area of the tube is affected, may remain sterile for varying periods, even for years. If healed in the course of time, furthered by freedom from intrauterine manipulation, it furnishes us with some of the cases of pregnancy occurring after hope of maternity has been abandoned. Gonorrheal pus has been noted in the tubes at operation, and conservative surgery has been followed by uterine pregnancy. (Mrs. P.)

To treat the milder cases, just described, by dilatation and curettage is to push the inflammation further out and to effectually close the outer ends of the tubes making the sterility permanent.

A little light may be thrown on one phase of this question by considering the so-called one child sterility. After one pregnancy, whether it end in labor (often with the use of for-

ceps), or a miscarriage or an abortion, or after ectopic gestation, no subsequent pregnancy takes place. Experience proves that in a large majority of instances, mild and often unrecognized tuboovarian inflammatory lesions are present. In addition, there are instances of ovarian neoplasms which preclude the possibility of ovulation. At the same time abortions and miscarriages may result in the formation of corpus luteum cysts or corpus luteum bodies in one ovary or the other, and we believe today that this condition has an important action in inhibiting ovulation.

What part a slight inflammation plays in the formation of corpus luteum cysts is not certain. The frequency with which they are found on the right side in young girls operated on for chronic appendicitis, makes the association possibly that of cause and effect. Now, in sterility of a primary nature the same factors as in one child sterility hold good, but in addition we must take into consideration the question of spermatozoa, ova and the supposed obstruction offered by the cervix, as well as the various degrees of undevelopment of the genitalia. If examination shows normal spermatozoa to be present, the next question is, Are normal ova present and are they given off from the ovaries? This constitutes an important point often decided only by the history and the subsequent course of events and by exclusion. If we take it for granted that both spermatozoa and ova are present, the point for us to determine is the nature of the trouble or the location of the obstacle. It may be the cervix, it may be the tube through failure of development, through trophic disturbances or because of inflammation. In addition to the element of obstruction we must realize that embedding of the fecundated ovum may fail to take place because of an abnormal uterine mucosa or because of lack of trophic stimuli to the endometrium or the fecundated ovum may be cast out by the menstrual process either before it embeds or before attachment is secure.

We are now concerned with the noninflammatory cases. The cervix is readily examined by touch, observed with the eye and entered by the sound. It is frequently, and often with-

out reason, considered as the obstacle to pregnancy because the external os is narrow, because there is a sharp angle at the internal os, because the sound does not enter the uterus or does so only after expert manipulation. How easy it is to say: Here we have the area which must be attacked.

If we look at the calibre of the Fallopian tubes as they pass through the uterine cornua into the uterine cavity, and observe the narrow lumen through which the spermatozoa pass out to join the ovum, and through which the fecundated ovum passes on its way to embedding, the element of cervical obstruction may be seen in a new light. My experience has taught me that if a cervix will admit a sound, it will in the vast majority of cases offer a safe avenue of approach for a spermatozoon; and I have come to the conclusion that it takes a terribly deformed cervix to keep an active spermatozoon from climbing upward, and no matter how large you make the cervix, a dead spermatozoon certainly cannot and an inactive spermatozoon will not find its way upward.

Fibroids, by distorting the outline of the uterus and the shape and situation of the tubal canal, may be a bar to pregnancy. On the other hand, we know many instances where pregnancy takes place in spite of the existence of fibroids. It is probably a mechanical question on the one hand, mainly distortion of tubes especially at the interstitial area, and a question of the menstrual function on the other. Fibromyomata grow during pregnancy, but in some instances the fibromata do not disappear in the stage of involution. This leaves a uterus much distorted by single or multiple nodules and is probably more productive of one child sterility than of primary sterility. If with any fibroid condition menstruation be excessive, that in itself may prevent the embedding of an ovum. In addition to which the point must be held in mind that fibroids probably represent an excess of trophic control by the ovaries and associated endocrine glands, the most important among these being the posterior pituitary lobe. In only a small proportion of cases is retroflection, from a mechanical standpoint, dissociated from anomalies of the en-

dometrium, tubes or ovaries, a bar to pregnancy. That it is possible must however be recognized. As a general proposition all such uteri capable of replacement, should be held in normal position by the use of the pessary. Granted then that examination excludes the conditions which we readily understand to be a bar to pregnancy, and that examination shows normal, active spermatozoa to be present, what do we find when we so lightly diagnose hypoplasia? So far as menstruation is concerned we observe those who menstruate normally, a small number who menstruate excessively and a goodly number in whom we note varying degrees of diminished menstruation at prolonged intervals.

Pregnancy does occur in patients who menstruate only every two or three months, even in patients who menstruate only twice a year. Whether these patients ovulate without menstruation or ovulate only when they do menstruate, this type of menstruation is not an absolutely bad sign in the way of prognosis, since endocrine therapy often restores a normal menstrual rhythm. Then come the varying degrees of uterine hypoplasia and here too I have learned to be cautious in making a prognosis. A normal regular menstruation is encouraging even if the uterus is small, but marked hypoplasia with diminished menstruation offers the severest test. Then we have the opposite type, patients with large ovaries and normal uteri who menstruate profusely. Here we have to deal with a possibility that the ovum may be expelled very early, in other words it cannot embed because of overstimulation by the endocrine glands concerned in menstruation. It is more than theory that the parathyroid, thyroid, adrenal and pituitary glands share in the premenstrual and menstrual function and are productive of many of the premenstrual phenomena.

When pregnancy occurs, enzymes given off by the fecundated ovum inhibit the processes leading to diapedesis and rhexis known as menstruation. If this process is not inhibited menstruation takes place. This lack of inhibition, which may be likened to toxin and antitoxin, furnishes us with that type of case which at occasional intervals goes a week or

ten days over the expected period and then menstruates. There is no doubt in my mind that many of these are cases of fecundation where the ovum is expelled before it has sufficient time to be firmly grafted. What of those patients married eight, nine or ten or more years who become pregnant without operation, without treatment? Here we must take into consideration the question of an inflammatory condition, or a dystrophia, either of which was righted in the course of time by the natural functions of the body. This factor may likewise apply to the male.

Because such cases inspire us with hope, let us adopt the motto "do no harm" for those patients who have never been pregnant, in whom the cervix suggests or in whom the microscope confirms the existence of an inflammation in the cervicouterine canal. These patients should be treated conservatively with no intracervical manipulation whatsoever. We consider these to have some tubal inflammation even if not recognized bimanually. We are not very hopeful for those persons who previous to coming to us have undergone some operative procedure on the cervix or uterus, such as dilatation, curettage, discision or cervical plastic.

Let us next approach the treatment in those cases in whom the use of the microscope, the Schultze tampon, our tactile sense and the history exclude an inflammation by way of the cervix. As an aside, let me repeat that appendicitis and tuberculosis may be responsible for tuboovarian inflammation. We divide these into three classes:—Those who menstruate less than is normal, those whose menstruation is normal, those whose menstruation is excessive; in any of these instances paying attention to the physical signs indicating ductless gland anomalies, especially of the ovaries, the thyroid and pituitary glands.

With regard to these cases our thoughts are as follows and on this we base our therapy. . . . Every month one ovary or the other should give out an ovum. This ovum supposedly capable of fecundation, is expelled into the peritoneal plasma and by the wave action of the ciliated epithelium of one tube or the other, is attracted into the outer end, carried along

the tube by the action of the cilia and then on into the uterus. The spermatozoa, if active, pass up through the cervix and uterus out into the tube by their own action against the current of the ciliated epithelium. The union of the spermatozoon and the ovum may take place outside of the tube, in the outer end of the tube, in the course of the tube or in the uterus.

The fecundated ovum embeds itself in the uterine mucosa as a result of enzyme action, sinking into the decidua itself and being almost covered by it. The next expected menstruation fails to appear, because this fecundated ovum gives off, whether embedded within the tube or in the uterus, hormones which nullify that action of the ovaries, pituitary and other glands which produce menstruation at supposedly twenty-eight day intervals.

If we are dealing with a case in which the spermatozoa are normal and presumably find their way upward and yet no pregnancy takes place, we are forced to the conclusion that either the ovaries do not give off their ova or that the ova are not capable of fecundation, or that they are not carried by the cilia through the tube, or that embedding does not take place or if it does take place it is not a stable, permanent attachment. It is interesting to recall some of the actual experiences which either directed attention to the ovary or which support and verify the theory that even normal menstruation does not always mean the liberation of ova.

Case I.—Mrs. R. Married seven years and sterile. Operated upon for sterility with a diagnosis of right salpingo-oöphoritis. The left tube was found normal, the right closed at the outer end, adherent appendix. Partial resection of the right tube was done, a portion of each very cystic ovary was resected, the appendix of course removed. Pregnancy within five months.

Case II.—Mrs. K. Married six years. Two premature labors. Operation for secondary sterility of three years' duration. Left dermoid ovary removed. Resection of half of the right cystic ovary. Has had one child, is now pregnant again.

Case III. — Mrs. D. Married six years. Persistent

menorrhagia defying curettage. Diagnosis, oyster ovaries. Half of each very large, flat ovary resected. Pregnancy within four months. Aborted. Pregnant soon after. Living baby.

Case IV.—Mrs. M. Married three months. Acute retroflexion, prolapsed cystic ovaries, dysmenorrhea. Glass stem pessary, suspension operation, resection of half of each polycystic ovary. Subsequent pregnancy, normal delivery.

Case V.—Mrs. C. Married two years. Cystic ovaries, ovarian dysmenorrhea. Resection of half of each polycystic ovary, endocrine therapy, pregnant.

Whether these patients became pregnant because of the operation or in spite of the resection operation on the ovaries, must be left to individual opinion. It must be added that four of them were curetted and one wore a glass stem pessary for several months.

As regards the ovary then, these findings and the pathological report suggest the following: The outer covering for some reason, congenital or acquired, is found to be firm and the Graafian follicles do not break. Graafian follicles may lack that enzyme which is probably responsible for the normal rupture of the thin convex surface, even if the outer covering of the ovary is normal. If either of these conditions exist, unruptured follicles remain in one or other or in both ovaries. In many ovaries there is a tendency to the formation of larger or smaller corpus luteum nests and of the so-called atresic follicles. The effect of these nests and these atresic follicles, generally known as cystic ovaries, is twofold. Either by mechanical means they prevent the ripening and thickening of the next Graafian follicle and the exit of its ovum; or as a result of retention in the ovary of these follicle cysts or of corpus luteum nests, ovulation is inhibited. Abortion or miscarriage are factors often responsible for the retention in the ovary of corpus luteum bodies and of corpus luteum cysts.

As regards the tubes. The tubes may be infantile in character, there may be congenital twists, the cilia may not functionate properly throughout the whole course of the lumen. What basis have we for these conclusions? Repeated observa-

tions of the tubes during laparotomy on patients who have nursed for a long period and particularly on patients suffering from lactation atrophy, have shown the tubes to be so atrophied, so poor in musculature, that they parallel absolutely the appearance observed in genuine hypoplasia due to errors of development. Though I have made no observation as to the cilia in these cases, I have adopted the view of lack of function.

As regards the question of failure of embedding and nesting, what co-ordinate experiences point to the acceptation of this view? It is not necessary to quote the observations proving the role of the corpus luteum in aiding and furthering attachment of the ovum, and the effect of early destruction of corpora lutea on the continuation of pregnancy. Let us deal for a moment with threatened miscarriage and repeated miscarriages. I have for years used thyroid in conjunction with arsenic, mercury bichloride and stypticin for both of these states with excellent results. I am now using extract of the whole ovary, thyroid and ovarian residue with an occasional dose of morphine for threatened msicarriage and the same preparation without morphine for repeated miscarriage, no longer paying exclusive attention to the Wassermann side of the question. The results are so excellent in both these conditions that I consider them the best test and the best proofs of endocrine therapy in the whole realm of gynecology.

It is only a slight step from this experience to the conclusion that if these gland extracts aid in preserving the contact of the ovum and its continued growth, that they must of necessity have the same power in promoting embedding of many a fecundated ovum which without this aid is cast off at menstruation. If these considerations concerning ovary, tube and decidua be true, the way to treat these conditions is clearly pointed out to us. We must substitute those internal secretions which are lacking or we must excite the action of certain of those internal secretions in order to cause the rupture of a Graafian follicle containing a ripe ovum; to give power to the Graafian follicle to secrete an enzyme which will enable it to rupture; to stimulate the lining of the tubes so that the cilia

will function and to exert a trophic action on the endometrium which will permit the embedding and retention of a fecundated ovum. In other words we stimulate by extracts of the glands which normally preside over those functions. On the other hand if the action of the ovaries and associated supporting glands be increased, and the patient menstruates too often or too profusely, then we are dealing with endocrines unusually assertive or a uterus too greatly stimulated. Here we must inhibit these stimuli and diminish menstrual function by endocrines or by resection of part of each ovary.

Although the usual treatment of sterility as I now practice it consists mainly of two preparations of ovarian extract and one of thyroid, let me make mention of a few general considerations. We prescribe according to the patient's local signs, menstrual symptoms and constitutional make-up. We judge from a patient's appearance, her weight, the distribution of hair, character of the skin, cold, clammy hands, premenstrual phenomena, rate of the pulse, blood pressure, as well as of our local findings. Now the glands which stimulate genital function are ovarian secretion itself, thyroid secretion, suprarenal extract, pituitary gland posterior, in some cases probably anterior. The glands which serve to diminish the menstrual function are thymus and mammary, placental extract, and in some phases probably thyroid.

When a patient shows signs of myxedema or myxedema of the endometrium is suspected, thyroid is indicated. If patients show signs of hyperthyroidism or exopthalmic goitre, thyroid is not indicated. Patients having a typical dystrophia adiposo genitalis are the victims of a pluriglandular condition. To such patients we give pituitary extract in addition to ovary and thyroid. Patients with low blood pressure and asthenia suggest the administration of suprarenal extract and pituitary extract. Patients with large uteri and excessive menstruation, patients with large ovaries and excessive menstruation, whether these ovaries appear cystic or not, the so-called oyster ovary, suggests the administration of thymus or mammary extract or placental extracts or all three.

In a series of fifty consecutive private cases of primary sterility, i. e., patients whose query was "Why do I not become pregnant?" I found that twelve had marked inflammatory lesions of the annexa, while two had ovarian neoplasms which did not permit of ovulation. Of these fourteen patients nine were laparotomized and the diagnosis confirmed. In fourteen cases the sterility was due to the male, the spermatozoa being either absent or markedly defective in number and motility. In ten patients where examination of the male disclosed normal spermatozoa, no pregnancy has resulted in spite of endocrine therapy. Of these ten patients only two had a normal menstruation. One of these two had been curetted and has a sensitive cystic ovary. The other eight of these ten unsuccessful cases are patients with irregular and markedly diminished menstruation, two of them being well marked examples of dystrophia adiposo genitalis. The menstruation in every case but one was improved by endocrine therapy and this patient, who mensturates only twice a year, discontinued the endocrines after a few weeks. (One of the ten has conceived since the compilation of these reports.) Twelve patients have responded to endocrine therapy, eleven having become pregnant within three months after administering the gland extract and one after this therapy was continued for months. In these twelve successful cases menstruation was irregular and below the normal amount in six cases and excessive in one case.

If we have succeeded in these twelve cases without dilatation, curettage or operations upon the cervix, that certainly excluded them from the category of cervical stenosis or cervical obstruction. The complete test would be to perform partial ovarian resections in the cases which have resisted endocrine therapy. The fact that most of them have relative amenorrhea makes me loath to make the attempt. I believe cases of normal or excessive menstruation to be the only ones favorable to abdominal interference. (See cases quoted above).

Endocrine stimulating therapy is the only rational suggestion in the different degrees of hypoplasia with relative amenorrhea. Here curettage is contraindicated. A stem pes-

sary retained in the cervix for months has much to commend it. Through auto massage and rhythmic contractions and through the associated trophic action on the ovaries, benefit might be hoped for, but the possibility of furthering some form of infection cannot be denied.

It may be granted that some of these patients might have become pregnant without endocrine therapy. Witness the case of Mrs. H. whose menstruation was excessive and who after taking thymus extract for two weeks passed her next menstruation and continued with her pregnancy. Also the case of Mrs. B. married one year who after taking ovarian extract and thyroid for three weeks likewise passed her next menstrual period and continued with her pregnancy. Of the successful cases the majority have responded within three months, which points to the stimulation of embedding and nesting as a very probable factor. This much is to be said for the endocrine therapy of sterility that it should be tried as a routine method in the promising cases before any operative procedure is attempted.

My purpose is not to decry the value of a curettage when dealing with cervical or uterine adenoids. We cannot wholly deny the possible value of a cervical dilatation or plastic. We cannot deny the value of correcting a retroflexion by pessary or operation. Our purpose is to banish routine indiscriminate cervical and uterine procedures as the first thought, and to concentrate our attention primarily on the areas higher up and thus eventually diagnose abnormalities and trophic changes which are in most cases the cause of sterility in woman, if the fault is the woman's. So I have come to this conclusion: Those cases of sterility with normal spermatozoa in the partner which after thorough examination show no inflammatory lesions, which menstruate normally or excessively, which do not yield to endocrine therapy, are legitimate promising cases for operation. Whether that operation be cervicouterine, or abdominal, or both, will depend on the faith one has in the idea that "cystic ovaries" and the endocrines do bear a relation to pregnancy and to sterility. On the other hand we must not confine our attention only to the female. There are cases where

spermatozoa are present; they are inactive or they are active but not normal. We attempt the same stimulation by gland extracts. We give here testicular extract, thyroid extract, pituitary extract, suprarenal, etc.

Sterility

Therapy aids us in proving a theory. If, for instance, any one gland extract or a combination of gland extracts without any other treatment cures a case of sterility, it may be a coincidence; in fact the patient might have been pregnant at the time of examination. If two or three or four other apparently normal but sterile patients, under the administration of any of the indicated gland extracts or a combination of extracts, without the aid of any other treatment, become pregnant within two to twelve weeks, it is suggestive. If a dozen sterile patients conceive under the same form of therapy, it is probable that the prescribed endocrines have caused changes of a trophic or allied nature which have resulted either in ovulation, fecundation, or nidation where one or the other has not occurred before. If thirty cases are successfully treated in the same manner, granted that there are failures, the reason for which can be satisfactorily given in most instances but not in all, we must conclude that the physician is justified in proclaiming the fact that endocrine therapy is valuable in the treatment of sterility. And here, in order to be explicit and clear and to leave no room for possible misunderstanding, it must be understood, as all reasonable medical men would naturally understand, that the curable cases are those where normal spermatozoa are present in the partner, where there is no double pysosalpinx or salpingitis or closed tubal ends, where there are no bilateral dermoids or ovarian tumors and where the uterus is of a size sufficiently approaching the normal to lead any reasoning examiner to understand that it might conceivably serve as the nest for an embedded and growing ovum.

These are of course the grosser and easily recognized obstacles to sterility but they have their finer and not so easily

demonstrated or recognized minor degrees of abnormality, such as completely cystic ovaries, or chronic inflammatory, and often gonorrheal, mucoid discharge from the cervix. Practically all cases, except such as are above mentioned, come into the realm of curable sterility.

A patient who had been married four months and whose previous menstruation varied in period between one and six months consulted a gynecologist, who performed a cervical plastic operation. A few months later she consulted another gynecologist, who curetted her. When she came to me her amenorrhea had lasted nine months. Examination showed complete atresia of the cervix which I corrected at operation and a cervical stem was introduced after a thorough irrigation of the uterus. It is not easy to understand why either of the previous procedures (cervical plastic or curettage) was attempted for the correction of sterility in a patient with such a menstrual history.

Each year I see several patients in whom a curettage has been followed by either a relative or a complete amenorrhea. There is beyond doubt an intimate relation between the ovary and the endometrium. The endometrium grows thicker, the cells enlarge, the capillaries dilate for from seven to ten days before each expected menstruation, this decidua menstrualis forming an appropriate nesting structure for a fecundated ovum. As the endometrium undergoes these changes through the stimulation produced by the secretion or secretions of the ovaries aided by other glands which exert a trophic influence on the ovaries and uterus, a reaction is exerted by the secretion of the endometrium upon the ovaries and this reciprocal influence is of importance.

If the uterine lining be curetted away too thoroughly, especially in what might be called a sensitive case, the reaction on the ovaries can be appreciated, and the untoward results just called to mind speak for themselves.

The normal endometrium is not a mucous membrane to be removed without reason. The curette has its place, and well does it serve us in properly selected instances. When the

endometrium is overgrown or polypoid, if uterine polypus or cervical polypus be present, if in a miscarriage all the tissues of the ovum are not cast out, if we suspect a malignant change in the endometrium, a curative or diagnostic curettage is indicated.

Certain cases of menorrhagia without appreciable change in the endometrium, certain other cases to which the name fibrosis uteri may be given, certain cases of fibroid of the uterus, respond splendidly to a curettage, especially if followed by the administration of ergot or ergotole or mammary extract, or by hypodermics of ernutin or aseptic ergot.

Is there any other danger than a resulting amenorrhea which can be mentioned or blamed on a curettage? The element which always makes me fearful is the possibility of an unrecognized inflammation.

Speaking now of women who have never borne children or who have not miscarried, a chronic discharge of greenish-yellowish, tenacious mucus from the cervix constitutes a warning. It is an evidence not of a hypersecretion but of an inflammation against which the cervix is battling by the production of mucus. An infection may extend up through the cervix and uterus into the tubes, ovaries, and peritoneum; and the cervix may react by no mucoid discharge. On the other hand, in many cases there is an attempt on the part of nature to fight the invading bacteria and thus limit the upward spread of the infection. Why some patients respond by this mucoid means of defense and others do not, is a matter evidently dependent on many considerations belonging more or less to the question of immunity. Such cases are never dilated nor curetted by me, and for two reasons: (1) It is almost impossible to cure this cervical discharge unless the entire cervical mucous membrane is removed, for so long as the deeply ending glands are preserved the mucosa will be restored and the infection still remaining in these crypts and in the connective tissue outside of them will continue to produce the discharge. (2) But a second and more important reason is our inability to determine, in all cases, how high the infection has spread;

and any curetting of the endometrium is of course contra-indicated whenever an infection, latent or active, is present in the tubes and in the endometrium.

Leaving aside, however, these cases with this pronounced cervical discharge, there are only too many where an infection has spread upward, leaving in the cervix few if any evidences. It is only when we collect on a cotton tampon placed around the cervix the secretion of the cervix and uterus for a period of twenty-four hours, and subsequently examine this discharge under the microscope, that we can with any certainty express an opinion on this all-important question. One has only to see a case of early gonorrheal infection respond favorably to conservative treatment—consisting at first of douches—to note how within a few months or perhaps even a few weeks, all signs of the original vulvar, vaginal, or cervical involvement have disappeared; and it would be a bold man who could express an authoritative opinion on the areas further up without the just mentioned method of examination. It is by collecting the secretion discharged upon this cotton tampon from the cervix and uterus over a period of twenty-four hours, and examining it under a microscope, that we remark how often a smear of pure pus cells is obtained; and if, after a period of months or years the cervical uterine discharge is negative, we still may have to deal with a latent inflammatory condition in the tubes.

It is only by comparing one's diagnoses with the findings during laparotomy that one visualizes the frequency with which salpingitis and cobweb adhesions escape the tactile sense. Therefore a dilatation and curettage may be productive of great harm if an unrecognized inflammation or a condition not correctly viewed as an inflammation is present.

The all-important point of spermatozoa frequently receives no consideration. Often enough have I observed patients who came to me because of sterility and who had been curetted—some of them twice and even three times—when my subsequent examination of the partner showed the sperma-

tozoa to be absent or to be present few in number, non-motile or only slightly active.

The element of hypoplasia or atrophy of the uterus and ovaries is of the greatest importance, and the greater the degree of relative amenorrhea, the less favorable as a rule is the prognosis. I am almost inclined to the belief that a menstruation every six or ten weeks, associated with a normal loss of blood, is of no worse prognostic significance than a regular menstruation of only a day or so; but it is as unsafe to state that such patients do not ovulate as it is to state that all women who menstruate normally do ovulate; for here again our experience during operations shows that many patients, in spite of regular menstruation, do not ovulate. The structure of the outer covering of the ovary may be so altered that Graafian follicles do not burst. Circulatory changes, frequently prompted by displacements, may have a like effect. The liquor folliculi bursts through the thin covering of the follicle and carries with it the ovum. But this bursting cannot be dependent simply on pressure; there must be in the liquor folliculi an enzyme or ferment which assists in this process. If because of any of these conditions the follicles do not rupture, the ovaries become filled with follicle cysts and these, together with corpus luteum rests, because of their presence, add to the difficulty of subsequent ovulation.

The cases of sterility favorable for treatment of any sort are those in which no evidence of inflammation can be found, those in which the hypoplasia is of no marked degree, and those only where spermatozoa in the male are found to be normal.

What is the treatment for these cases?

Heretofore, and even now, with many the favored plan is a dilatation with or without a curettage, or some form of cervical discission or plastic. This denotes that those who practise these methods exclusively believe the mechanical obstacle of the cervix and its canal to be the one and important factor. I do not hold to this opinion nor have I held this view for many, many years. A cervix which will admit a sound, which is not filled with overgrown endometrium, is rarely a

bar to the upward movement of the microscopic spermatozoa. Besides, as I have frequently stated, the interstitial area of the tube is infinitely smaller in caliber than the cervix, and yet the ovum is passed through it into the uterus and the spermatozoa pass out through it into the tube.

My explanation as to the causation of sterility in the so-called favorable cases fixes the blame either on the ovaries and the failure of ovulation, or on the tube and its cilia which are to move the ovum into the uterus, or on the uterine lining which is the ground in which the ovum is to nest, or on the inability of the fecundated ovum to inhibit menstruation.

If a patient pregnant eight weeks or more menstruates and casts out the ovum with its chorionic villi, we call it miscarriage, but if the fecundated microscopic ovum, without villi, is cast out when a patient is only a few days over her menstruation, we are in no position to be certain that this has been the case, yet in all probability it occurs often enough.

The most interesting phase of pregnancy is the amenorrhea. Why does menstruation fail to take place when a tiny fecundated ovum settles in the uterus, or occasionally in the tube?

Menstruation is the loss of blood poured out from the capillaries and vessels of the endometrium when no pregnancy has taken place. The endometrium, like a wet sponge, is relieved of its engorgement and returns in a few days to its normal thickness. No lining has been lost, only a few epithelial cells. Under the stimulation exerted primarily by the ovaries and possibly accentuated by a remaining ruptured follicle, the endometrium prepares itself again in the form of a decidua menstrualis for a fecundated ovum. When such a fecundated ovum enters the uterus and nests itself beneath the surface it does show a growth of cells on its outer covering; these cells do penetrate into the surrounding tissue and capillaries, but menstruation does not take place. It is too much to say that a certain reflex stimulation has inhibited menstruation; the only available explanation is that the cells of the outer covering, entering as they do the maternal circulation—those cells

which form the future chorion and placenta—by their action as a hormone, hold off the menstrual flow.

Menstruation is dependent on the normal action of the ovaries and their secretion. If the ovaries are removed, no gland extract that we can give will restore it; therefore the ovaries supply hormones and are aided by other hormones which we cannot yet supply to the body in efficient character or sufficient or proper quality. The ovaries are not essential to life. When removed, in spite of the flushes and other annoyances, duplicated in many instances at the normal climacterium, the patient's physical health is not seriously affected. These flushes are due not only to absence of ovarian secretion but to a hyperactivity of the posterior pituitary. The ovaries are of the greatest importance, however, because they normally furnish each month, in supposedly ripe form, at least one of the twenty-five or thirty thousand ova which they contain; but of all the structures of the body which have a secretory function the ovary is the weakest in that its activity, as well as its development, is dependent on a proper trophic support by other glands; and this trophic support is quite as essential for the tubes and uterus as for the ovaries.

Pathology has taught us how profoundly the growth of the body may be held in check or stimulated or altered by the overactivity or underactivity of the pituitary gland, the thymus, the thyroid, the adrenals, etc., and it teaches the gynecologist how profoundly the genital tract is involved by disease of these same glands. An underactivity of the pituitary most profoundly affects the development of the ovaries and the uterus; but if posterior pituitary inactivity takes place after their development, it may bring about their atrophy. Affections of the thyroid gland play an important part. Aside from these changes, the genital tract may be injured by the infectious diseases of childhood or by subsequent constitutional diseases (leaving displacements and inflammations aside).

Now menstruation, initiated as it is by the ovaries and preceded as it is in normal cases by the exit of an ovum, is not

a local process only. It is a constitutional involvement not experienced disagreeably by many women but associated in very many instances with what are known as premenstrual phenomena; and these premenstrual phenomena are due not only to the changes produced in the body by the cumulative action of the ovarian secretion, but to the associated altered activities of the thyroid, the adrenals, and the pituitary gland, especially the posterior lobe. The general symptoms of this recurring premenstrual period always show which of the endocrines is or are stimulated or inhibited and thus the unstable member or members of the chain are disclosed. So we may say that the trophic support of the genitalia—of the uterus in particular—is dependent, not only on the ovary itself, but on the thyroid, adrenals and pituitary likewise. Here we must not forget the action of the adrenal glands. If we are to initiate a glandular or endocrine therapy for sterility, we have only to point back to the rôle which pathology, if nothing else, has taught us; for tumors of the pineal gland, of the pituitary, of the adrenals, etc., have frequently enough been found to have a marked influence on growth and sex development. Acromegaly, myxedema, the dystrophias, the rarer cases of Addison's disease, etc., have their decided rôle in affecting the functions of the ovary and of the uterus, and the same holds true of the like diseases of lesser degree.

Now, coming back to the question of sterility itself; I doubt whether in the last ten years I have dilated, curetted, or done a cervical plastic (except for intractable dysmenorrhea) in five per cent. of the cases of sterility which I have viewed as curable. By curable I refer to cases where the husbands have normal spermatozoa, where tuboovarian, inflammatory, and tumor conditions were absent; and where the menstruation was normal, or if deficient, was not associated with a marked polyglandular anomaly of a type as severe as a well-developed dystrophia adiposogenitalis. Among these cases, the vast majority fell into the class of relative uterine hypoplasia. The whole plan of treatment was dominated by (1) the notion of trophic stimulation of the genital tract in those cases where

the theory of substitution implied a lack of autostimulation by the patient's own endocrines; (2) the theory of inhibition in a smaller proportion of cases where menstruation was excessive; (3) the theory of stimulation and inhibition where uterine contractions with or without excessive menstruation might be presumed to expel an ovum a few days after fecundation and attempted nidation, especially if nidation occurred shortly before the menstrual period.

I found that in a certain proportion of cases the patients, during one, two, or three periods of the year, went a week or ten days over menstruation, but at other times menstruated to the day; and in this type of cases the results of endocrine treatment have been so uniformly good that I was forced to the conclusion that the menstrual wave often throws out the ovum before the nesting is completed or fixed. There is during pregnancy a recurrence of the menstrual wave at regular periods. It is painless, not recognized in the vast majority of instances, and is associated with minor degrees of molimina in others.

Some pregnant patients have periodical headaches; others have an occasional spotting of blood at intervals corresponding to the menstrual period; others bleed more noticeably. Now, others go through the experience of expelling an ovum of varying degrees of development, resulting in what we call abortion or miscarriage. We give to this latter phenomenon when repeated the title of habitual miscarriage. In other words, there is during pregnancy a constant struggle on the part of the endocrines concerned in menstruation, to produce it, and a struggle on the part of the ovum and the secretion produced by its outer covering, to inhibit menstruation. This struggle between the two opposing forces comes to a crisis on the two hundred and eightieth day in what we call a labor. But here again not infrequently, inhibition allows the patient to go some days to weeks over her expected date; other patients are delivered a few days or weeks before the two hundred and eightieth day. Of course, in many cases this is due to the fact that ova may be fecundated immediately after a menstruation, while other ova are fecundated shortly before the first skipped menstrua-

tion. The treatment of these latter conditions—the type of individual who goes a week or ten days over her period, occasionally, when she otherwise menstruates normally, and including all the various types with a tendency to menstruate during pregnancy—consists of trophic stimulation first and then of inhibition of the menstrual stimulus. We have used for this purpose rest in bed, the administration of opiates and sedatives; but instead of waiting and depending upon treating cases of habitual abortion only when the symptoms of expulsion of the ovum develop, or instead of relying, as we have been wont to do, on the theory that these cases must on examination evidence a positive Wassermann (which is far from the truth), we administer endocrines which act trophically on the uterus or which inhibit the menstrual stimulus, and our results improve in certainty.

It is, of course, the most desirable part of our therapy to administer the endocrines, either for the purposes of trophic stimulation or for the purposes of inhibition, on the basis of a study of the individual's endocrine make-up, seeking to find in each and every case, if possible, the special factor or factors which are at the bottom of either condition. But even if this is difficult or impossible, we do know that the ovary and its secretions, both of the interstitial and of the glandular apparatus, have a decided trophic relation to the well-being of the genitalia. We know that the thyroid gland bears a close nutritive value to the genital functions, and that the adrenal cortex likewise bears an important part of this trophic burden. As to the hypophysis, we know from the study of the physiology of the gland that its relation to the genital tract is close and that affections of the hypophysis may influence menstruation and the development of the uterus for either better or worse.

The anterior lobe, concerned as it is with the general process of body growth, includes within the field of its activities the development and function of the genitalia. The posterior lobe, as can be understood from its action in labor, is concerned with the rhythmic uterine contractions of the same; hence my

conclusion that overactivity of the posterior lobe at menstruation is responsible in most cases for uterine dysmenorrhea—and therapy proves this to be true.

The thymus gland has the effect in some cases of inhibiting ovarian activity. Based on physiological study, extract of the placenta should have a quieting and inhibiting effect on overactivity of the posterior pituitary. Proceeding from this basis, I have used it in a very large series of cases and have found it to be of the greatest value in those cases of dysmenorrhea and repeated miscarriage and in a large number of pelvic conditions and general states due to posterior pituitary hyperactivity. Inasmuch as the use of placental extract in threatened or repeated miscarriages has always been associated with the use of other endocrines and occasionally with the use of sedatives, the reliance that may be placed on this extract alone is not yet settled in my mind.

Since working on this theory and following this practice, I find results which, in comparison with the results obtained by other methods are not only encouraging but decidedly effective, I have not the faintest interest in proving that dilatation and curettage are never followed in previously sterile patients by subsequent pregnancy, for the record and experience of able men in gynecology proves that it is true. I simply feel that curettage and dilatation and cervical plastics have not attacked the basic factors which, in the majority of cases, in my belief and in my experience, are of greater importance. What possible error is a physician committing if he treats a case of curable sterility by endocrines before he attempts any surgical procedure? Then, if this treatment is not successful, he is the more justified in assuming that some surgical procedure is necessary. The fact that he may decide on a cervical operation, while I would be more inclined to advise the removal of cysts from the ovaries, would then furnish a basis on which we could eventually accurately measure the rôle which the cervix plays as an obstacle to impregnation. And when it comes to the question of curettage, with the subsequent restoration of a new endometrium, I hold that unless the endometrium is

overgrown or polypoid, endocrine therapy restores it to a type and character favoring nidation just as well if not better and with less danger. We must understand the difference between fecundation and that continuance of nesting and growth of the ovum which we call pregnancy; and I am firmly convinced that, whatever endocrine therapy does to the ovary or tubes, in a large proportion, if not the largest, it acts trophically in aiding the ovum to nest or in retaining it after it sinks into the endometrium. In other words, union of the ovum and spermatozoon occur in an untold number of cases, but nidation or permanent nidation fails.

If this be true, it is sad to think of the innumerable unborn, still remaining in the Blue-Bird Land of Maeterlinck, whose potential mothers might have permitted them ingress into this mundane sphere.

The maternal instinct can be one of the most powerful of all instincts but is of varying degree. The same holds true of the sex instinct. But while both are associated with endocrine stimuli, both trophic and otherwise, there is a vast difference here in the intensity of the somatic effects and in the intensity of those psychic phenomena connected with either of these instincts and their associated emotions. An individual may have a strong maternal instinct and little sex urge or receptivity; and many women reconcile themselves to the sexual side of married life because thereby comes the subsquent reward of maternity. Others have the physical and psychic sex phenomena of normal or exaggerated character with little of the maternal instinct. Children give pleasure, joy, or sorrow according to the accidents and fates of life which are theirs; and these depend much on the moulding and development of their instincts, emotions, disposition, and character. Parents take the chances associated with heredity, environment, training, education, etc., and the developing child is the product. Sterility, according to the instincts, emotions, disposition, and character of the patient may be accepted with indifference, with regret, or with a continued yearning or longing; and because

of it psychic effect may spoil or destroy the desiring-to-be-mother's life.

The correction of sterility does not, as is the province of medicine, simply benefit a mental state, correct an ill, or save life; it helps to create life.

I have never told a patient that the fault is her husband's, however often this may be the case. Sterility is so frequently productive of depression and psychic disturbances, the causes of domestic infelicity are numerous enough, why add this new brand to a smouldering or even brighter flame? I tell the patient to take the medication for several weeks only, that it may produce a favorable effect only after months or years; or that causes which we cannot discern and correct may right themselves even after a long interval of time. The disadvantage of this advice is that it makes the patient think the method is useless (which is a burden physicians have to bear continually in their practice). Another disadvantage is that it often throws the patient into hands favorable to dilatation, to curettage, discission, or cervical plastic, regardless of or in ignorance of the absence of spermatozoa. Perhaps this is not always so unfortunate a result, for the patient then feels that she has exhausted every known means for the treatment of her sterility. Time, plus resignation and philosophy, may then remove the too absorbing mental concentration.

In "The Medical Clinics of North America," ii, 4, I tabulated a series of fifty cases of sterility showing the number due to absent or inactive spermatozoa, the cases which did not become pregnant, though spermatozoa were normal, and the cases which became pregnant—five after operation on the tubes or ovaries and twelve after endocrine therapy.

The purpose of this tabulation was an attempt to show the relative importance of tuboovarian conditions, absent or faulty spermatozoa, and marked alterations in menstruation in their relation to sterility, and by reporting the proportion of cases cured by endocrines, to arrive at various conclusions concerning the entire question of sterility.

CHAPTER X

PREGNANCY, LABOR, AND THE PLACENTAL GLAND

In individuals growing normally and developing properly the ovaries come to maturity and develop properly if they are sustained and nourished by a proper secretory relation on the part of the thyroid, the adrenals, and the hypophysis. Before puberty an inhibiting action on the sex organs by the pineal gland and the thymus gland is removed and, with all these conditions fulfilled, normally developed internal and external genitalia are present and menstruation begins at the proper time and recurs regularly without any marked annoying phenomena, provided that the infectious diseases of childhood have not affected the ovaries, or their supporting glands.

A disturbance in the nutritional functions of the thyroid, the hypophysis, and adrenals of especial magnitude interferes with the proper development of the genitalia and the ovaries. Unusually prolonged or permanent inhibition by the pineal gland or the thymus results in failure of proper action on the part of the ovaries. On the other hand, in a certain number of cases, a too early removal of the inhibitory action of the thymus and pineal gland or a marked stimulation by the other three glands results in an early maturation of the ovaries and very early activity. It is an old saying that normal menstruation implies ovaries capable of producing ripe ova. I think in the light of modern medicine that this opinion must be modified considerably. A woman may menstruate and menstruate early and yet the ovaries and the Fallopian tubes may not be functioning normally. The ciliated epithelium of the Fallopian tubes is under the trophic influence of the ovaries and probably the thyroid and hypophysis. If the cilia do not function, no tube can send an ovum into the uterus. I believe that in many instances there are ovaries which for various reasons do not expel ova; that is, they do not liberate the ova from the ovary. A Graafian follicle approaches the surface but something is

lacking which normally breaks the follicle and expels the ovum. Normally there must be something in the ovum, in the follicle, and in the cells lining the follicle whose ferment action dissolves the outer covering of the ovary and thus liberates the liquor folliculi with the enclosed egg. Beside cases where this ferment action is not present there may be cases where the tunica albuginea is unusually thick and unusually resistant. If we believe in the relation of the ovary to the other internal secretory glands, if we believe in their trophic care of the ovaries and genitalia, if we believe in the inhibiting action of some of these secretions on the ovary, we must conclude logically that there are many cases where the ovaries do not liberate the ovum. In other words, ovulation in the strictest sense does not occur. We then have in these ovaries retained follicles, the so-called atresic follicles. Numerous cases show these atresic follicles in excessive number. Trophic support by the pituitary posterior lobe is lacking.

One function of the true corpus luteum cells is to inhibit the maturation and breaking of follicles during the period of pregnancy. With atresic follicles, with unbroken follicles, with corpus luteum cysts, and with unabsorbed corpus luteum centers of smaller or larger size, there is exerted on the follicles an inhibitory action and this may likewise be one of the very frequent causes for the failure of ovulation to take place in the nonpregnant.

I believe the hypophysis has much to do with this inhibitory action on the ovary; inhibitory not in the active sense, but most probably inhibitory in that the proper stimulation is not given. Dystrophia adiposogenitalis is the extreme type. So I believe that it may be concluded that a large proportion of cases of sterility in which spermatozoa are present in the male, in which no inflammatory changes are present in the cervix, uterus, or tubes, and in which obstruction of a positive type is not present, are to be considered as due to failure of ovulation. I have proved this to my satisfaction by several successful results after "wedge resection" of both ovaries. I mention these facts in this chapter in order to show how in-

timately connected are the other glands of the body to those glands which are specially related to the nutrition of the uterus and the decidua and to the function of menstruation and ovulation.

The development of the secondary sex characteristics depends upon the ovaries through the co-operation of the other glands and by action of the other glands themselves. The development of the mammary glands is especially under the action of the ovary. No matter how well the other glands function, if the ovaries are removed in the early years a failure of development of the internal genitalia, the mammæ, and the secondary sex characteristics occurs; and if this occurs after puberty then atrophy of these various organs takes place, most particularly, however, in the sphere of the genital tract. Our attention is thus fixed on the value of the secretion developed by the ovary, by the interstitial structure, by the follicles themselves, and by that substance known as the true corpus luteum which develops excessively before menstruation and continues only, under normal conditions, when pregnancy exists.

Now the ovaries are responsible for menstruation through the action of the vegetative nervous system and more so through direct action of the secretions on the tubes, uterus, and its lining through the medium of their circulation. That the corpus luteum plays an important trophic part is not to be doubted, but it is also a secretion produced by the ovary.

We know in a general way the action of these various secretory glands and we know more and more each day of their interactivity, and how a failure in the way of overaction or underaction on the part of one influences the whole cycle. Now, into this realm of interglandular activity there enters a new phase in pregnancy. When an impregnated ovum comes into the uterus and imbeds itself in the overgrown decidua by enzyme action inherent in itself, menstruation fails to take place. Menstruation is preceded by a tremendous hyperemia of the lining of the uterus, increase in size and thickness of the endometrium, and a dilatation of the capillaries. The secretion of the ovarian tissue tends to diminish the coagulability of the

blood, and the glands of the decidua secrete a substance which probably has the same action. Through the action of ovarian secretion aided by pituitary secretion capillaries break through rhexis and there is a diapedesis of red blood cells and contractions of the uterus. Only blood is thrown off; the decidua remains behind after menstruation like a wet sponge from which the water has been expressed. These processes are inhibited when a fecundated ovum is in the decidua. We know that cells given off from the outer layer of an impregnated ovum are thrown into the circulation as soon as it is imbedded. Slight as this amount must be in the early days of pregnancy it is sufficient through the medium of the circulation, thence reaching the ovary, stimulating the corpus luteum, and acting on the uterine lining and continuing to circulate in the blood, to inhibit menstruation, though hyperemia and congestion present in the uterine mucosa continue, but rhexis and diapedesis are inhibited. The trophoblast cells of an impregnated ovum are primarily responsible for this.

The next change produced by the trophoblast cells is in the reaction produced in the corpus luteum. This body does not regress as it does when pregnancy does not take place; it simply continues its growth for a period of many months. This continued growth and function of a corpus luteum is undoubtedly a reaction produced by the trophoblast cells. This corpus luteum is important. It continues its nutritional effect upon the uterus and particularly upon the decidua, inhibits menstruation, aids the continued attachment of the ovum and probably exerts a protective influence in preventing too great an encroachment into the decidua and later into the uterus of the trophoblast and syncytial cells.

The nutritional action of the true corpus luteum is of far greater importance in the first months of pregnancy than it is later on for it aids the trophoblast in inhibiting the posterior pituitary. Later on the ovum has developed to a considerable size, a placenta has formed, the entire ovum fills out the cavity of the uterus, and the periphery of the ovum is agglutinated to the entire interior of the uterine cavity. The

uterus in these early months grows rapidly, more rapidly than would be expected by the simple stretching effect of the ovum. The ovum hangs by a pedicle in the early weeks and does not by any means fill out the cavity of the uterus. Yet the uterus grows. It does so even in cases of ectopic gestation. Here we see the continued stimulation by the anterior pituitary, adrenal cortex, thyroid, etc., secretions trophic in their nature, and the uterus and the decidua well supplied with blood. The blood contains the secretion of the ovary which would have been expelled and lost had menstruation taken place. Thus the placental secretion plays an important part in stimulating the growth of the uterus.

The next process is the effect of the trophoblast secretion upon the hypophysis gland. The anterior lobe hyperfunctions and the change in its cells is a permanent one. We know what the anterior lobe does in the process of growth, bone enlargement, and sexual development; and we must consider this and other gland activity as a protective or trophic secretion designed to help the patient herself, probably designed to help the ovum, the uterus, and the decidua in these early months with probably a greater effect on the patient and embryo in the later months.

The painless contractions of Braxton Hicks are probably due to corpus luteum, but much more to the posterior lobe of the hypophysis, and are a continuation of the automassage ever present in the normal uterus. The increased activity and size of the thyroid, too, and the changes going on in the adrenals and other glands, may be viewed in the light of an increased trophic effect on the genitalia, probably giving off to the patient certain protective substances. The patient in pregnancy needs protective substances because the trophoblast and later placental secretion are entirely new elements and the body must react to it through the medium of the other secretory glands and through the production in the blood of other protective substances as in fevers and other diseases.

The earliest evidences of the irritating effects of the trophoblast and later placental secretion are to be found in the

nausea and vomiting of pregnancy. This new substance is an irritant. It irritates the cerebral centers and the posterior pituitary, for this reason having an irritating action on the gastric mucosa, the pylorus, and the liver. Whether the premenstrual hyperemia and congestion which take place in every part of the body and which are associated with dilatation of the cerebral vessels, heightened by the continuous action of the corpus luteum, play a part in this process can only be surmised. At any rate we are justified in considering that the secretion produced by the outer cells of the ovum and later by the placenta is the irritating substance which is primarily responsible for the nausea and vomiting. In whatever degree the body reacts to this and produces the protective endocrine substances, in that degree is the nausea and vomiting either stopped or continued. If we consider that the corpus luteum of pregnancy is continued as a reaction to this placental secretion, we ought to look upon the corpus luteum as an aid in stopping the nausea. Many observations in this direction have been made and it has been claimed that the injections of corpus luteum extract into these patients stops the nausea and vomiting. Theoretically the idea is splendid and rational; in practice opinions vary. Many are enthusiastic over it. I have not yet had striking success with this procedure, but corpus luteum by mouth and injections of corpus luteum are of value if they succeed in inhibiting the posterior pituitary. At any rate, in the vast majority of cases these annoyances in the way of nausea leave permanently at the time that life is felt. In many cases this condition may be excessive, taxing our resources to the utmost, and in some cases pregnancy must be interrupted to avoid permanent or fatal harm to the patient. In these cases the protective substances that are produced by the ovary, the liver, the hypophysis, the *thyroid,* or the system in general, are not produced in sufficient amounts or proper character, and a condition of pernicious nausea and vomiting or early toxemia is present. The transient albuminuria present in some cases in the early months is probably due to the irritating effect of this placental secretion or to hypothyroidism. Overstimulation of

the posterior pituitary is, with thyroid minus, the basic endocrine factor in the toxemia of pregnancy.

Many patients in pregnancy show quite a growth of the body, a growth sufficiently noticeable to attract attention. The tonic effect is remarkable. Many show at various periods an acromegalic hyperplasia. A transitory thickening of the skin of the face and a suggestion of edema are also decidedly suggestive of a hypophysis change allied to acromegaly. Here we are confronted with the stimulative changes in the anterior lobe of the hypophysis, a reaction undoubtedly produced by the action of the placental secretion.

We next come to the transient glycosuria present in many cases during the various months of pregnancy. It is found intermittently in many cases where routine examinations of the urine are made. This draws attention to the pancreas, to the liver, and to the hypophysis, and possibly to the mammary gland (lactosuria). A transient or even a marked involvement of the pancreas function may occur and there may be a disturbed relation between the thyroid and the pancreas. There may be the liver type of glycosuria. Possibly the mammary gland may have an effect. For the most part we must look to the hypophysis as responsible for this condition. So far, it is known that a more or less marked glycosuria may appear with transient hyperfunction of the hypophysis particularly of the posterior lobe. This factor plus the changes occurring in the anterior lobe speaks for the excessive or increased action of the hypophysis, at least part of it, a reaction probably due directly or indirectly to the placental secretion. That true diabetes may be unfavorably affected by pregnancy, and that it is a most serious condition, is known to everyone.

The mammary gland is also stimulated in pregnancy. It often reacts to the premenstrual stimulus of the corpus luteum. It increases in size after labor and its secretory functions are finally established after a preliminary hyperemia. Injections of various substances increase the function of the mammary gland. Fetal extract used experimentally stimulates this gland. So does corpus luteum. Placental ex-

tract and pituitrin will accomplish the same result. The most that may be said is that the mammary gland is acted on during pregancy probably by the ovary, possibly by the fetus, but most probably by the placental secretion and the posterior pituitary. After labor, when these stimulating factors, though apparently inhibited before, are no longer inhibited by the placenta and a degenerating or secretory process occurs, milk is secreted instead of colostrum. Whether the hypophysis has anything to do with this before or after labor is not known, but some consider the hypophysis secretion a remarkable galactogogue. It is safe to say that no one known substance will positively produce a well functioning breast. Thyroid extract has been used, pituitary extract has been used, placental extract has been used, corpus luteum has been used. I have tried each one of them and am as yet unable to say that any one or a combination of them will, with any degree of certainty, produce milk in every breast. My experience has been that breasts either secrete readily or not, and no régime of food, diet, or tonic treatment will do more than add a stimulus. My later experience has been that a very small percentage of women are able without endocrine aid to nurse their children sufficiently for several months.

It must be kept in mind that the ovum and the placenta are a parasite. The nourishment of the fetus taxes the resources of the mother, but this burden in the majority of cases is not an excessive one, if the heart and kidneys are normal. I formerly believed that cardiac diseases could with great care bear the burden of a pregnancy. With increasing experience I am very loath to allow a patient with marked cardiac lesion to be endangered for nine months by pregnancy and labor. It is not the tax on the general system alone. There is something in the ovum and in the placenta which through its action on the other endocrines exerts a markedly injurious action on the heart muscles, on valvular lesions, and on the cardiac centers which encourage and control the rhythm and the force of the beat. In these changes and alterations lie the danger of pregnancy with marked cardiac lesion.

If the Barnes or Champetier de Ribes bag be introduced into the cervix, this dilatation of the cervix causes uterine contractions at first painless. These are not felt by the patient as pains. There is a feeling of discomfort and a sense of pressure in the back. After hours, sometimes after many hours, labor pains come on. Not infrequently a second or a third bag must be introduced before the uterus goes into rhythmical contractions. If, however, after the introduction of a Barnes or a Champetier de Ribes bag, pituitrin in small doses is given regularly, rhythmical labor pains come on and many hours of waiting are saved. It is almost never necessary to introduce a second bag.

If the membranes rupture before labor sets in, it takes from six or eight hours to three days before labor pains come on spontaneously. If after the membranes have ruptured even days or weeks before labor is expected, pituitrin is administeerd in small doses at regular intervals, it will bring on rhythmical contractions and the patient goes into labor within a very short time. Removal of the liquor amnii causes some contraction of the uterus and possibly some stimulation or secretion of the decidua, and dilatation of the cervix by a Barnes bag causes contractions of the uterus with possibly some effect upon the decidua. The uterus is sensitized, the pituitary gland is stimulated, and for that reason the administration of pituitrin is effective.

It has long been known that the administration of castor oil at or about full term has a certain effect in bringing on labor pains. We all know the value of quinine in increasing the force of labor pains. It may be taken for granted that each of these substances sensitizes the uterus and makes it more susceptible to the action of the pituitary posterior lobe.

Acting on this theory, I tried the following procedure to avoid the use of the Barnes bag: At 7 a. m. an ounce and a half of castor oil was administered, and three hours later at half hour intervals ten grains of quinine. One or two hours after the last dose of quinine, two to five minims of pituitrin were given every half hour for several hours. This method was

effectual in many instances in bringing the regular rhythmical labor pains and sending the patient into a normal labor. I found this procedure perfectly reliable in over eighty per cent. of multigravidæ when tried within a week or ten days of the expected labor period. In fifty per cent. of primigravidæ it is effectual at or about the time at which labor is expected. If this method is tried from two to three weeks before the expected time, the effect is by no means so good and in many cases has no result at all.

The ovary nourishes the uterus, making it grow, but causes regular bleeding. The placenta nourishes the uterus, making it grow, but stops bleeding. If the corpus luteum acts on the hypophysis posterior lobe and, though it ought to inhibit it, makes it overact instead of underact at menstruation, we often observe menstrual pain simulating that of labor and called dysmenorrhea. Corpus luteum and the posterior pituitary lobe act as antagonists in menstruation. The placental secretion normally inhibits the posterior lobe as well as does the corpus luteum and no menstruation takes place, only painless contractions.

With an ovum full of atresic follicles and corpus luteum rests ovulation is often inhibited, but the stimulation to the posterior lobe is not present, coagulation takes place slowly or quickly and diminished or excessive menstruation occurs, according to the reaction of the postpituitary, but no ovulation.

It would be wise to try the effect of placental secretion on dysmenorrhea, because of this theoretical inhibition by its action on posterior hypophysis either directly or through the corpus luteum. If placental extract stimulates the anterior lobe of the hypophysis it might be advisable to use this extract in cases where it is desired to stimulate growth in children, with the administration of hypophysis extract also.

If the corpus luteum in any case rouses the posterior lobe of the hypophysis, causing menstrual pain, then corpus luteum is not indicated at all in dysmenorrheas.

But if placental extract inhibits the posterior lobe of the hypophysis and holds its contractile powers in abeyance for

months, then it might be wise to give placental extract for dysmenorrhea. If ovarian extract and ovarian residue stimulate the uterus and its lining, causing diapedesis and rhexis, and if placental extract results in growth of the uterus but overcomes diapedesis and rhexis, then we should give placental extract in cases where excessive menstruation is due to hyperovarianism. We may thus dissociate the function of the ovary and pituitary as nutritional factors of the uterus, from their function in causing menstrual bleeding. And we must think of the placenta as an organ which directly or through its effect on corpus luteum nourishes the uterus and its lining but which overcomes its tendency to bleed.

Therefore, even if ovarin is contraindicated in menorrhagia, this may be overcome by placental extract. If the decidua stimulates the corpus luteum and this stimulation is lost by menstruation then placental extract by inhibiting menstruation allows the retained decidual secretion to continue its stimulation of the corpus luteum. If we knew just what elements of the decidua or the ovary or the corpus luteum or the pituitary were responsible for the capillary dilatation and increased tension resulting in rhexis and diapedesis, we would find them antagonized by some placental ferment or hormones and by the corpus luteum.

To conclude these theoretical considerations, some of which are being proved true, it may be stated that labor represents a crisis in the relation among the glands of internal secretion, particularly the ovary, thyroid, the placenta, and the hypophysis. On the two hundred and eightieth day a magnified menstruation takes place. Placental inhibition is overcome, the ovaries, so to speak, come into their own, and the posterior pituitary gland exhibits an action whose character is exemplified by and intensified by the pituitary extract which we use in obstetrics. If placental hormones antagonize or inhibit the menstrual action of the ovary and pituitary, it is probable that in many cases this inhibition is ineffectual. If this be so this lack of power in the placental hormones may explain repeated abortions (Wassermann negative) occurring

at menstrual intervals. This explains the well known liability to abortion at periods four, eight, twelve, etc., weeks after the first skipped menstruation. It also explains the tendency to go ten or more days "over the period" with a then ensuing menstruation. These occasional occurrences in a few of my patients must and may be viewed as early expulsions of an imbedded ovum whose trophoblast secretion has not inhibited the menstrual stimulus of ovary, and pituitary, and adrenals.

Pituitrin causes rhythmical contractions of the uterus. The effect wears off quickly, lasting only from half an hour to an hour. This drug is probably excreted quickly in view of its well known action on the kidneys. The amount that can be given by mouth and by injection even daily is decidedly evanescent in effect. This explains my incomplete results on continuing its use even daily by hypodermic use in cases of menorrhagia or metrorrhagia unless this administration is preceded by a thorough curetting, which temporarily inhibits ovarian function. It compares in no way so far as prolonged contraction is concerned with the effect of ergotol or ergot. And this explains the value of ergotol or ernutin by mouth or by hypodermic injection in the postpartum stage. If pituitrin is given before labor is completed, it causes powerful contractions of the uterus; it also causes excessive relaxation. This accounts for the rare bleeding effects postpartum. Hence ernutin, or aseptic ergot by needle or ergotol by mouth, are the best drugs in the postpartum stage, and this may explain why with its use postpartum hemorrhage is rarely noticed.

From these considerations we pass on very readily to the theory of eclampsia. Logically we must conclude that placental secretion is the important factor. It does not produce this annoyance in a large proportion of instances because some protective substances are secreted or formed anew. They come from the ovary and corpus luteum, from the thyroid and adrenals, from the hypophysis gland, from the liver, and from other structures in the body not yet recognized as taking part in this protective function. Then come a certain number of cases in which this function is not properly carried out with

the result that placental secretion exerts a decidedly irritating influence. Placental secretion is a substance which follows the course of the blood into all the organs of the body, producing changes of a marked character, particularly in certain instances in the liver with marked alterations of metabolism. These changes are of a necrotic nature and of a hemorrhagic type showing the irritating nature of this secretion. If the usual protective substances are lacking, this secretion takes on an irritative, destructive nature. The changes are produced typically in the brain, microscopic in nature, associated occasionally with hemorrhages of a graver type and with edema more or less diffuse and often quite marked and not rarely associated with increased pressure in the spinal canal. Hence in persistent convulsions and especially in coma, spinal puncture should be tried in all cases.

The kidney annoyances of eclampsia are mainly those due to the excretion through these organs of the irritating placental and altered metabolic substances which irritate the epithelium and produce the albumin and the other changes which are in this type of cases an evidence of the toxemic secretion in the blood. With a normal or overactive thyroid such a condition is less likely.

What the acidosis and diacetic acid are due to we need not discuss at present, but in this metabolic change the liver, in all probability due to its lesions, takes an important part. The pancreas must likewise be considered.

What is the reason for this possible explanation of eclampsia? Let me refer for a moment to hydatid mole and to chorioepithelioma. In the hydatid mole we have an abnormal myxomatous development of the chorionic villi with an unusual penetration of them into the uterus and an unusual penetration of those cells of the outer layer of the chorion.

The fact that the cells in their growth and invasion are normally held in check is evident. As soon as the trophoblast cells invade the capillaries and maternal blood is poured out, these cells change to the so-caled syncytium cells. These syncytium cells then form the outer covering of the villi, act-

ing as a sort of endothelium, and through them and the cells underneath them the exchange between maternal blood on the one hand and the capillaries in the villi on the other hand takes place. Therefore in the blood there are substances which inhibit excessive penetrative action of these cells and define the degree to which they may extend. If, then, the protective substances, especially in the thyroid, are lacking, one would naturally expect an unusual development of the chorionic villi in size and number, and also an unusually deep penetration of the syncytial and Langerhans cells, a condition which actually takes place. This need not be surprising, because during all the months of pregnancy the syncytial cells and fragments of chorionic villi are thrown off into the circulation and have been found in the various structures of the body. They naturally are absorbed, forming a secretion.

Now in chorionic epithelioma the same thing is carried to a greater degree. We have no dilatation of the chorionic villi, no excessive growth of them, but we find, several weeks or several months or even two years after a labor or an abortion, certain cells of the chorionic villi, chorionic syncytial cells which have been left behind, undergoing independent growth, developing into a tumor, spreading through the blood into the neighboring structures and into other parts of the body. Here it is evident that the chorionic cells have persisted through various periods of time, not alone have persisted and remained alive, but have taken on a sudden growth which nothing in the maternal blood can hold in check. In other words, the protective influence has been lost or some endocrine stimulation is present (post-pituitary).

So far we know only about the ovarian lutein cell changes in this condition, and I know of no experiment or postmortem examination made upon the hypophysis gland or other gland structures in cases of this type. As far as the placenta is concerned we may certainly say that the ovum is a parasite, that the trophoblast cells, syncytial cells, and the placenta are at all times held in check in normal cases by certain substances in the blood. (Thyroid, corpus luteum.) When these protec-

tive substances are not present in sufficient quantity in the early months, the expected nausea and vomiting occurs. When they are not held in check in the later months either a yellow atrophy or the toxemia of pregnancy of the liver or kidney type occurs, and in other instances the hydatid mole and the chorio-epithelioma.

Whether the parathyroids are in any degree concerned in eclampsia is not certain. It is possible that mild attacks may simulate the type of tetany. We know the effect of calcium metabolism on the general nervous system. We know that a normal amount of calcium is necessary to preserve a sedate, stable reaction of the nerve cells. A diminished amount of calcium renders them extremely susceptible to irritation. The ovaries, the thymus, the parathyroids, and the thyroid are intimately concerned with calcium metabolism, and during pregnancy the functions of these various glands may be so altered, the calcium content of the body and nerve structures may be so diminished by parathyroid insufficiency, that we have in this state, generally unrecognized, an increased susceptibility to irritating substances.

It is the preëclamptic stage to which especial attention should be called. We find, on the one hand, cases with marked involvement of the renal function as evidenced by albumin, casts, and occasionally more or less general edema (hypothyoridism). We find, on the other hand, cases with digestive disturbances and headache, dizziness, excessive irritability, or the contrary type of mental apathy and dullness (post-pituitary plus). High blood pressure is a most important danger signal (thyroid minus, post-pituitary plus). No man should fail to pay attention to conditions where the urine is abnormal, especially if acetone and diacetic acid are found. Greater and greater significance should be given to the symptoms of nausea and vomiting, liver tenderness, headaches, alteration of vision, dizziness, high blood pressure, and allied suggestive symptoms.

Wellbeing is a sign, as a rule, of absence of toxic condition. Whenever a woman in the latter weeks of pregnancy does not feel well, whatever the nature of the symptoms, a

preeclamptic condition should be constantly considered and considered until absolutely excluded by a decided change for the better in the patient's general condition.

I consider a great amount of rest in the latter months of pregnancy a most important factor. I do not believe in the theory of excessive exercise for patients who are pregnant. Plenty of fresh air and normal function on the part of the kidneys with care in the diet are important in every case. One of the greatest improvements in the field of obstetrics is the use of the Murphy drip. I feel that the Murphy drip containing five per cent. glucose and two per cent. sodium bicarbonate the very best treatment for the cases of early toxemia of pregnancy and especially valuable in cases showing preeclamptic symptoms. In eclampsia I consider it one of the most important methods under our control. I think the acidosis of eclampsia or in the eclamptic or the preeclamptic stage of great importance as a dangerous symptom and condition. This condition should be combated constantly and most actively. Personally, I consider pituitrin contraindicated in cases of high blood tension and in cases showing preeclamptic symptoms, and assuredly in eclampsia occurring during labor. It causes powerful uterine contractions, forces placental contents into the circulation, and, if the placenta is the important element in this toxemia, puts added burden on the liver and other glands already unable to overcome the toxins in the blood. Excess of post-pituitary with its action on the kidneys and on the choroid plexus of the cerebro-spinal canal, plus hypothyroidism are the important causal factors.

Cæsarean section is to my mind the treatment for severe toxemia and eclampsia, unless the patient can be delivered by forceps without great effort in a very short period of time.

In eclampsia the uterus should be emptied if it is held that the placenta bears an important relation to the development of the toxemia. The next step is to diminish the convulsions. The third step is to aid energetically in the elimination of the toxic products and in overcoming the acidosis. It is generally agreed that the uterus should be emptied quickly,

if it is to be emptied at all, and emptied in a manner which affects the patient's resistance in the least degree. A manual dilatation of the rigid cervix of a primigravida and the application of forceps or the practice of version are measures which take time and have a decided effect upon the patient's resistance and vitality. They likewise jeopardize the welfare of the fetus. These babies are affected by the toxemia of the mother and many of them have the same lesions as the mother, many of them have convulsions, and many of them die. Any mode of delivery which makes it hard and difficult for the baby jeopardizes its existence. A slow method of dilatation with a bag or allowing Nature to proceed by her own method, a delivery going along several hours, even if uterine contractions are not excessive or are controlled by morphine, is certainly a great disadvantage to a woman in convulsions. Powerful uterine contractions with expression of placental secretion into the blood and liver have a most injurious effect on the toxemia. Of course, the head may be in the midplane, the cervix may be soft and readily and quickly dilated. Then extraction may be done readily within a short period of time with uterine contractions excluded by morphine and the anesthesia. Here the indications are fair for delivery by the natural route.

Contrast with this method, however, in any but such favorable cases, the operation of Cæsarean section. To make a comparison, I believe that if Cæsarean section were performed in a hundred routine cases in any hospital and the results were compared with a hundred vaginal operative deliveries—the average run of cases with high or low forceps, version, etc.—we would find everything in favor of Cæsarean section. Practically all the children would be delivered alive, if alive at the time of operation. The patient takes nitrous oxide and slight ether anesthesia, the operation lasts only from twenty to thirty minutes, no more blood is lost than in normal delivery, the intestines are scarcely touched, and convalescence is normal.

On the other hand, in a hundred routine cases of heads not firmly engaged in the brim of primigravidæ at full term where forceps are often used or where version must be done,

injuries are produced in the cervix, tears and lacerations of the perineum occur, and a goodly proportion of the patients have to have an operation subsequently for relaxation of the bladder, rectum, and the pelvic floor.

In preeclamptic toxemia and in eclampsia the same principles hold good. The anesthesia affects the patient slightly; the operation is done quickly; the child is saved without any manipulation or any injury to it, and if it has any chance to live at all, it certainly has a vastly increased chance if delivered by Cæsarean section. Contrast the four per cent. mortality for the fetus, mentioned by Peterson in the Cæsarean section for eclampsia, with the thirty to forty per cent. mortality when delivered by the normal route, and no further discussion of this phase of the question is needed. Even in a normal patient with a fair degree of difference in the pelvic measurements or in the size of the head, we do a Cæsarean section in a primigravida to make certain of a living child. This holds good in a double degree in cases of severe toxemia or in eclampsia. To summarize, the advantages of Cæsarean section are rapid delivery and the removal of the placenta with a minimum of shock to the baby and the mother, the delivery of a child with everything in favor of its remaining alive and well, and absence of injury to the pelvic structures. Surely these advantages are sufficient to point to Cæsarean section as the more advisable routine method. Most important of all we avoid the uterine contractions of labor. Even if a certain proportion of cases of eclampsia are not of a severe type, one can never tell after the first few convulsions, whether coma will intervene. Many of the patients have a profound involvement of the kidney, as evidenced by albumin, casts, red blood cells, etc. A decided acidosis may develop. These cases probably are of both the renal and liver type, and even if one may argue that patients would have survived with normal route delivery from below, surely their welfare is in no sense jeopardized by Cæsarean section. And many of these patients do manifest the severest form of convulsions, often with coma. I believe that the routine administration of thyroid extract

from the moment that albumin or casts appear, or from the moment that the blood pressure rises, and then continued for the duration of pregnancy will prove to be a boon to the field of obstetrics.

Toxemia patients, the so-called preeclamptics, may have convulsions in labor induced or coming on without help. And when we come to the more severe type, the so-called liver type, rapid emptying of the uterus is necessary, for it is not alone the emptying of the uterus that will cure the patient, it is the subsequent treatment which is necessary and that is certainly possible only with an empty uterus.

Convulsions must be diminished by every possible means. A convulsive attack of a severe nature repeated at frequent intervals is a tremendous strain on the patient and is a tremendous strain on the heart. Many of these patients die of edema of the lungs. Each successive attack with a convulsion, the rise in tension, the strain on the heart, and the interference with respiration, affects the degree of resistance profoundly and certainly often causes an edema of the lungs and brain and disturbance of the spinal structures. This edema of the brain is undoubtedly responsible in many cases for the coma of a profound type. The role of the post-pituitary in this condition and in affecting the osmosis of the cerebro-spinal fluid through the choroid plexus is the special point of importance.

I find morphine the best drug for convulsions. Even if it does in a slight degree interfere with elimination by the kidneys, this disadvantage is not great. In addition, we know of no better treatment for threatened edema of the lungs than the use of morphine. In some of these cases of profound coma, it has been found that a spinal puncture is a lifesaving measure; and it should be attempted in every case, and if an increase of fluid under great pressure is found, it should be repeated whenever the indication demands it. If the fluid-extract of veratrum viride, given repeatedly in small doses, diminishes the blood pressure, the pulse rate and the convulsions, well and

good. In my hands I have found morphine when indicated the more reliable drug for this last purpose.

The next step demands the elimination of the toxic products and the combating of the acidosis, which is of utmost importance. High colonic irrigations are necessary. It is wise to use an alkaline fluid, either bicarbonate of soda or acetate of potash, very warm. Gallons should be used, not quarts. Irrigations should last half an hour and from ten to fifteen gallons should be used. This should be repeated two or three times in twenty-four hours. If the colon is tolerant between these irrigations a continuous Murphy drip of five per cent. glucose and a two per cent. bicarbonate of soda should be administered. The purpose of the colon is particularly to absorb fluid as well as to excrete, as far as we know at least. Hence high colonic irrigations with an alkaline medium probably will help in absorbing into the body a fluid of an alkaline nature which not alone neutralizes the acidosis but dilutes the toxins and promotes diuresis.

Venesection is highly praised by some men, and with a high blood pressure and a full pulse it may be indicated, 300 to 500 c. c. being taken. Whether it is advisable to substitute this by the injection into the blood of any fluid or human blood is a question. I rather fear a saline infusion afterward if the blood pressure remains high, for, having drawn off the blood, the labor of the heart is diminished, and if a large amount of saline is injected in place of the removed blood, we may promote an edema, which is the one thing which must be avoided.

The overcoming of the acidosis is of the utmost importance no matter what the condition of the kidneys may be, and no matter how little they may be secreting with or without decided amounts of albumin and casts. The acidosis is of the utmost danger. Hence I repeat that the high colonic irrigation should be of an alkaline nature and the Murphy drip should contain glucose and an alkali. In the acidosis a deficiency of carbohydrates is concerned, and if we supply sugar to the body by absorption through the colon, and at the same time use

either bicarbonate of soda or acetate of potash, we are doing all that we know to overcome this destructive process.

The feeding of a patient, if coma lasts, is of greatest importance, not alone to sustain the existence of the patient, but to aid in overcoming the acidosis, for the starvation certainly adds to this state. Hence patients should be fed at regular intervals by the stomach tube if in coma, peptomized milk being of the very best aid. Bicarbonate of soda may be added to this.

I wish to mention an interesting case:

Case.—The patient went into coma forty-eight hours after the first convulsion, which occurred six hours after her delivery. Labor was induced because of the preëclamptic symptoms associated with a marked nephritic stage. Chloral and bromides by rectum and morphine, however, controlled the convulsions. On the fifth day she manifested a decided interference with her respirations, showing a Cheyne-Stokes type. A spinal puncture was done and the fluid shot out under great pressure and large amounts were withdrawn. Within five minutes her breathing became perfectly normal. The spinal puncture was repeated on two successive occasions.

I believe this patient's life was saved by the spinal punctures. This has taught me to view every case of coma following toxemia or eclampsia as possibly due to cerebrospinal pressure. Spinal puncture should be done if only for diagnosis. There is certainly no difficulty and no danger to the patient, and there is a hope that it may save life.

Reviewing the questions discussed in this chapter, I can only emphasize my opinion that, based on logic, theory, and the statistics of Peterson, abdominal Cæsarean section at or near full term is the method for eclampsia and for toxemia of severe type. I feel that much can be done in a proper study of patients during the last four or five weeks of pregnancy. Attention must be paid to the blood pressure, examination for acidosis, examination for albumin and casts, subjective symptoms such as headache, dizziness, nausea, vomiting, mental dullness, a change in disposition, all of which should be looked for in every case, and when present should be considered preeclamp-

tic and signs of excessive danger. High blood pressure is of grave significance. Thyroid extract should be given in all cases. If the child is viable, safe delivery should be the procedure. If delivery can be rapidly followed out by the normal route without labor pains, well and good; if not, Caesarean section should be done. Theoretically corpus luteum which stimulates the thyroid and inhibits the post-pituitary should be valuable. Thyroid extract to lower blood pressure and prevent swelling of the renal epithelium is indicated throughout pregnancy in many cases. Placental extract may some day be used to inhibit if possible the post-pituitary. The placenta, which is probably responsible for the toxemia of pregnancy, is developed partly from the spermatozoa contributed by the partner. This condition may possibly, therefore, be allied to anaphylaxis.

CHAPTER XI

CONSTITUTIONAL DYSMENORRHEA

The idea that the ovaries, by reflex nerve stimulus, are responsible for menstruation is old and no longer held. Menstruation results because no fecundated ovum takes its place within the uterus after the ovarian secretion has caused a thickening of the mucosa in preparation for the nidation of the ovum. As a result of menstruation the mucous membrane goes back to its former size and state, and a few days before the next awaited period undergoes, as a result of ovarian secretion, the same changes in preparation for nidation.

These local phenomena, resulting through the selective action of the ovarian secretion, are associated with phenomena in other parts of the body, resulting from or roused by the ovarian secretion and other hormones stimulated by the ovaries. These phenomena produced by the ovarian secretion partake of the nature of congestion and hyperemia, with increase of vascular tension, affecting particularly mucous and serous membranes and the endocrine glands and glandular structures of the body.

There is an increase in the blood-pressure seven to ten days before menstruation. Patients often complain of headache, colicky pains in the abdomen, drawing pains in the back and pelvis down into the thighs. In a nervous patient uterine contractions may increase up to the degree of spasticity, resulting in dysmenorrhea, evidently associated with an existing hypersensibility. Menstruation may affect the eye and lids in many ways; may affect the ear, the digestive tract, larynx. There may be periodic toothache, labial herpes, stomach pain, loss of appetite. The premenstruated period has a bad effect on ulcer of the stomach. The skin changes are frequent, such as chloasma, erythema, eczema, urticaria, nervous skin swellings, etc.

Involved in this constitutional reaction, ofttimes visibly involved, is the thyroid gland. It is a matter of common ob-

servation that the neck enlarges and the thyroid swells during menstruation and during the early months of pregnancy. In pregnancy we have, as causative factors, the true corpus luteum and the trophoblast; in the premenstrual period we have only the ovarian secretion, that produced by the follicles and false corpus luteum and the intestitial gland, the former stimulating the glandular thyroid. This idea of interrelation and antagonism between ovary and thyroid appears to be generally accepted; they stimulate each other, and, at the same time, are probably antagonistic.

The reaction of the individual's endocrines to the premenstrual cumulative influence of the ovarian secretion follows different types—some patients do not know from any symptoms at all that menstruation is approaching; others show the local pelvic phenomena of congestion, discomfort, or pain; others have a constitutional alteration, characterized by a dull, heavy, tired feeling; a goodly proportion show symptoms of irritation, and constitute the excitable type. The reasons for these different types are to be found, naturally of course, in the character of the ovarian secretion, its stimulation of other secretions, and in the sensitiveness of the organism that is being played upon, so to speak. In some patients there is very little constitutional congestion produced by ovarian secretion, and very little alteration in any of the mucous or serous membranes; other individuals are possessed of a placid, nervous system, in many ways almost insensitive to such changes. In certain women the thyroid is scarcely stimulated by the ovarian secretion, or reacts too slightly, if at all, to its cumulative influence; in others, the faintest beginning of ovarian premenstrual activity is immediately followed by a response of the thyroid, in the form of actual or relative over-activity, and the same holds true of the pituitary and the adrenals.

The reaction of an individual to the premenstrual phase is a fairly good indication of the sensitiveness of that patient's nervous organization at that particular age, or of the stability of that patient's endocrine system. Whether this is due to either of the two gradations, too much ovary or too much or

too little thyroid, pituitary or adrenal secretion it is an index of considerable importance.

Some severe cases of premenstrual constitutional annoyances are found in what might be called "nervous," "neurotic," or "neurasthenic" individuals, and this "nervousness" is in many cases nothing other than hyperthyroidism or hyperadrenalism or hyperpituitarism, evident, too, in the intermenstrual periods. We are concerned also with that type which is relatively free, in the intermenstrual periods, from "nervous" symptoms.

Preceding the menopause age and stage, instances of constitutional dysmenorrhea become rather frequent. We have the types of cases in which the annoyances were present to a greater or lesser extent for years from puberty on, or else developed at a later period, or came on after marriage, or were aggravated by various circumstances. Then comes another and important type, the cases into whose histories these annoyances come as a new process. These patients in their earlier years had slight, if any, premenstrual annoyances. As they approach the period of life when they look forward to the menopause their menstruation continues, even grows stronger, with or without intervals of amenorrhea, and marked cyclic states of irritability appear. These cases are, in a large number of instances, hyperpituitarism or hyperthyroidism; some of them are cases of actual or relative hypothyroidism, for we find instances of the very opposite type, too, where a phlegmatic and depressed state results, a condition often due to hypothyroidism. The cause of this dysthryroidism lies in the thyroid and ovaries. Either the latter functionate with marked energy, or overshadow the thyroid activity, or they actually overstimulate and rouse the thyroid gland, or else they work with less than their former power, but the thyroid fails to regress with equal degree, and a state of cyclic hyperthyroidism results, and the same holds true with the pituitary and the adrenals and other glands.

The administration of thyroid gland extract between menstrual periods and before menstrual periods, serves to aid in

making the diagnosis. In the hyperthyroid cases the premenstrual annoyances are brought out in the intervals, or are brought on earlier, or are accentuated by the administration of thyroid extract. Among the medical methods, preparations of bromides, and of veronal and ovarian extract, ovarian residue, and suprarenal extract, help to diminish the annoyances. In the hypothyroid or hyperovarian type, doses of thyroid are of value. In the hyperpituitary form, placental extract and thyroid extract are indicated, especially if the blood pressure is high or is increased at the premenstrual period. In some of the hyperthyroid cases small doses of opium and belladonna in suppositories are absolutely necessary to give the patient relief, not so much from their pain and discomfort as from the irritability and ofttimes almost maniacal restlessness which typifies these hyperthyroid cases. In the hypothyroid form, or hyperovarian type, thyroid should be given. Hyperactivity of the adrenal medulla, hyperactivity of the posterior pituitary are frequently associated. This hyperactivity of the adrenal medulla often accompanies hyperthroidism and is generally associated with all the severe forms of hyperthyroidism. I believe that overactivity of the posterior pituitary is the cause of exaphthalmos and it is often associated with hyperthyroidism.

The fact that patients who have never had these annoyances in their earlier years, and that patients who evidence at times the symptoms of myxedema, acquire at later periods, and most particularly in the preclimacteric stage, these constitutional nervous phenomena, shows that at that period there is decided susceptibility to alterations in the balance between thyroid and ovaries. This lack of balance between thyroid and ovarian secretion, and probably in very many instances a malrelation between other glands, especially the hypophysis and adrenals, is of great importance. Too much ovarian secretion can cause congestive symptoms associated with irritability. It is common knowledge that the change of life, as the laity call it, is a critical period. It is not sufficiently recognized that each premenstrual period is often quite as critical.

Are these cyclic annoyances to be explained simply on the theory of congestion and increased tension produced by the ovarian secretion, or do other elements, influenced by the ovarian hormones and by the corpus luteum, play an important part?

The change in gland relations which occurs at puberty, at which time minor thyroid annoyances are frequent, the thyroid phenomena at menstruation, during pregnancy, in association with ovarian affections, and during the climacterium, find a parallel in the fact that the more typical diseases of the thyroid, myxedema and Basedow's diseases, are eight to ten times as frequent in women as in men. No satisfactory explanation for this has yet been given. It always seemed to me plausible that the instability of the relation which the thyroid bears to the ovaries and uterus, the monthly menstruation, the presence of the corpus luteum, etc., makes the thyroid surely more susceptible to the intercurrent causes, whatever these may be, which produce these same diseases in a far smaller proportion in men. In women the glandular thyroid acts more than does the interstitial.

The monthly play produced on a woman's nervous system by the premenstrual ovarian stimulation causes, either of itself or, in many cases through an exaggerated response on the part of the thyroid, posterior pituitary and other glands at these times, a group of nerve phenomena like those in hyperthyroidism and hyperpituitarism and hyperadrenalism, to which may be given the term constitutional dysmenorrhea.

Some patients are depressed almost to the verge of melancholy before each menstruation. They are sluggish in thought, indifferent to their surroundings. There is a mental inertia, they are inclined to be sleepy and drowsy, and awake without a sense of well-being. Pulse is slow, there is a sensation of cold. They constitute the phlegmatic type, and are the opposite of the type to which I desire particularly to draw attention as the more frequent.

There is in this other and important class of patients a nervous excitability in the premenstrual phase, an irritability,

and a restlessness that is almost maniacal. The patients cannot keep quiet, find it impossible to lie down or rest, are unable to keep their minds on any one subject. They have not the patience to take part in conversation, or to listen to any talk or information. They realize that their train of thought is unusual. They have a sense of heat, and complain of burning sensations. There is a tremor about the hands, and the knee-jerks are exaggerated. They sleep badly, and have a pulse of 90 or more. (Hyperpituitarism, hyperadrenalism, hyperthyroidism.)

There is another class of patients, in whom there is a play between hypothyroidism and hyperthyroidism. The symptoms of hypothyroidism may seem to be manifest between menstruation, only to be changed to the type of hyperthyroidism before and during menstruation. We must dissociate that type suffering from well-marked annoyances of probable hyperthyroidism at all times from the type where the hyperthyroidism is characterized by its premenstrual periodicity.

Mild forms of hypothyroidism, which are called "neurasthenia," are very frequent. On the other hand, in "neurasthenics" there is overactivity of the thyroid. Just as the larger number of cases of hyperthyroidism are transient, and recover rapidly with appropriate medication, so many of these cases of so-called constitutional dysmenorrhea are cyclic hyperthyroidism, hyperpituitarism, hyperadrenalism, and may be benefited or cured.

It must be remembered that various emotions and mental stimulation rouse the thyroid, pituitary and adrenals to activity. The same is true in the sexual sphere, and holds good for some of the diseases of the genitalia. Alcohol, coffee, tea, iodids, and arsenic stimulate the thyroid. The endocrines are quieted by rest, freedom from sexual stimulation, and by the correction of pelvic congestion and pelvic pains. A milk diet, the glycerophosphates, ergot, and especially the bromids, opium, and belladonna, are of great service. In most cases ovarin and ovarin residue and placental extract work best of all.

The uterine lining is acted on by the ovaries, probably by the follicle secretion. Some of the cyclic phenomena, occurring in the uterus as part of the normal process called menstruation, are due to the interstitial gland. The uterine lining reacts on the ovaries, too, for, if the uterus is removed, ovarian secretion gradually diminishes and ofttimes ceases long before the end of two years. The lining of the cervix and uterus and their hormones react on the ovaries. When a fecundated ovum is present, it stimulates the ovary to the production of a true corpus luteum, and this corpus luteum still further stimulates the decidua and uterine growth. We are certain that the relation of the thyroid to the ovary, to its follicular apparatus and to the corpus luteum sensitizes the thyroid gland, and that the relation between the uterine lining and the ovary sensitizes the ovary.

If we remove the endometrium, we take away one of the elements which react on the ovary. If we can make these patients cease menstruating and leave the ovaries behind, the oversecretion of the ovaries and the cyclic response of the thyroid and the pituitary seem to be markedly weakened and usually removed, and the reaction of the ovaries to the endometrical hormones is done away with. I know only one way of preserving the ovaries, for a time at least, and putting a stop to menstruation, and that is to remove the uterus. My list of operative cases of this type at present is not large enough to go into an extensive discussion of the subject. I am, with each year, more and more convinced that hysterectomy, especially vaginal hyserectomy, whenever possible, offers, in a large number of such cases, relief from annoyances which not infrequently persist for years, and which may bring patients, to say the least, to the verge of invalidism. I can see no theoretic objection to the procedure. It spares the patient the oft-associated loss of large amounts of blood which, in itself, is a factor worthy of consideration.

In hundreds of cases of real hyperthyroidism the thyroid is removed in part, or its blood-supply is diminished by operative procedure, when the indication is by no means one of life

and death but only one of comfort. Why should not the same view of eventual surgical relief hold good in the type of constitutional dysmenorrhea which I have mentioned?

This type of cases referred to here cannot be properly studied or appreciated in dispensary practice. They seem to affect patients in the higher spheres of life, and require long-continued observation to thoroughly understand the type of annoyances, to make the diagnosis by observation and by the use of thyroid, placental extract, suprarenal extract; to see the effects and improvements obtained by local treatment, the use of ovarian extract, suprarenal extract, placental extract, etc., and the elimination of psychic irritations.

It has been said that no uterine hormone has ever been demonstrated. It is impossible to confine ourselves, in a theoretic argument, or attempt to come to a logical conclusion, to facts absolutely demonstrated in the laboratory or by animal experimentation. Besides, there are hormones which produce an immediate result, such as adrenalin, pituitrin, or which give a quick response within a few days, such as thyroid. The ovarian hormones and the uterine hormones do not act so promptly, even when both ovaries are working in the human economy; it takes them twenty-eight days to produce their cyclic uterine alterations, and if the hormones of the uterus do respond and react on the ovary it is probably only an activation of the ovarian secretory function, all of which are points which animal experimentation or human observation can clear up with difficulty in such a direct and rapid manner as to prove that these hormones do exist. Besides, the ovary possibly possesses other hormones than the products of the follicles or luteum secretion (interstitial gland).

A point of great importance is the answer to the question, why does ovarian secretory activity diminish after removal of the uterus? Now, it is a fact that scarcely a single secretory gland can be removed experimentally, in whole or in part, without involving the other glands of the body in the way of hypertrophy or atrophy. This interrelation between the glands is very complicated. If removal of the uterus, and

with it its lining, does produce such a result in the ovaries, then, whether uterine hormones have been demonstrated or not, it must be apparent that a failure of the uterine elements to react on the ovaries deprives the ovaries of a certain stimulus which keeps up or activates their function.

If a too thorough curettage be done, or if any intra-uterine manipulation be carried out which ends in a cessation of menstruation, and gradual, temporary, or permanent amenorrhea, why haven't we the right to say that something has been removed from the uterus which has a stimulating action on the ovary, the ovary underfunctionates, fails to re-stimulate the uterus sufficiently, and by this diminution of interaction ovarian and uterine atrophy results? The same idea holds good, in all probability, in lactation atrophy as a result of mammary secretion.

Though it is true that the thyroid is the cause of many of these annoyances, the hypophysis plays a most important part. So do the adrenals. No one can deny the importance of the hypophysis. In childhood it is an important factor in promoting growth, and lack of it inhibits development, both of the body and the genitalia. In adult life too much hypophysis causes acromegaly; too little hypophysis causes dystrophia. The hypophysis is intimately connected with the development of the sexual apparatus. Its influence is altered during pregnancy, but all these changes are of a slower type; they take weeks or months to produce their pregnancy annoyances. Yet the posterior pituitary and the adrenals take part in the monthly cyclic changes. The ovary and its relation to the thyroid, pituitary and adrenals represent an apparatus in a continual state of changeable relation, and that changeable relation is cyclic, and is one of the responsible factors in making women the "weaker sex." Why is it universally recognized that the thyroid has a most intimate relation to the genitalia; it is practically a sex gland. There are well-defined symptoms for hyperthyroidism and hpothyroidism. In oversecretion of the thyroid we have the greatest variations from typical cases of exophthalmic goiter to cases without the exophthal-

mos, without the marked goiter, without the tremendous tachycardia, down to the forms characterized by nervous irritability, by digestive annoyance and only moderate degrees of tachycardia. Some of these eventually develop symptoms which makes the diagnosis absolutely certain, others improve so rapidly that our first diagnosis seems afterward to have been only a suspicion. Many of the cases are masked, and may be developed by irritation or by the administration of drugs given for therapeutic or diagnostic purposes. One must not be influenced by just a few symptoms which are present, nor should the diagnosis be excluded because a certain number of symptoms are absent. When viewed from the psychic sphere alone, the mental phenomena of undersecretion of the thyroid or pituitary and oversecretion of the thyroid or pituitary may occasionally resemble each other, yet attention to other points of diagnosis usually aids in making the differential distinction eventually and then, after all, the administration of thyroid and placental extract eventually gives us the clue we want. In a large proportion of cases we have an overactivity or an underactivity of thyroid and pituitary posterior and adrenal medulla. In the same way we must depend upon long observation, upon the study of minute points, on an observation of the individual in the interval between menstruation, and the effect of drugs, and local therapeutic measures in making a diagnosis of these premenstrual cases. It is well to remember that posterior pituitary plus and thyroid minus is a frequent combination and that high blood pressure is then a symptom. Many of the symptoms are simply due to overstimulation by the ovarian secretion and the corpus luteum, and it has been my desire to attract attention to cases where the annoyances are due to the thyroid gland which, hypersecreting or not at other times, is aroused to overactivity by ovarian and corpus luteum stimulation. And right here, too, we must not overlook the type where an actual, or relative, hypothyroidism is concerned in the premenstrual and menstrual phase. In gynecology we have been suffering for years with the idea that the sex organs, through reflex channels,

have dominated a woman's physical and nervous makeup. Lacerations of the cervix have been operated on, retroversion of the uterus has been corrected, prolapse of the ovary has attracted great attention, and various anomalies of the uterine lining have been considered, all of them, by reflex channels, to produce headaches, palpitation of the heart, nervousness, irritability, indigestion, and mental diseases. I have no objection to surgeons doing all the work they wish on the internal genitalia for mechanical and other reasons, but, as common-sense physicians, we must get out of the idea that by reflexes these lesions play their rôle. It is only when we understand the makeup of woman, the relation between ovary and thyroid, pituitary, adrenals, etc., the effect of rest, the valuable influence of the correction of congestion; it is only when mental and psychic stimuli and irritations and the effect of sexual stimulation and deprivation or abnormal coitus are considered, that we can intelligently understand the nervous affections of womankind and treat them intelligently.

During all the years that the uterus is present, acted on by the ovaries, reacting on the ovaries, related directly or indirectly to the thyroid, pituitary and adrenals, the uterus is an organ of importance only from the standpoint of propagation, and all the nervous annoyances from which women suffer because of the fact that they have ovaries and uterus are the price which they pay for possessing an organ necessary to motherhood. After motherhood is no longer to be considered, or after a stage when motherhood should no longer be considered, the uterus is absolutely of no value. So long as it is productive of no annoyances, all is well. When that uterus is the seat of benign or malignant growths, operation is generally recognized as the only treatment in the malignant cases, and as the advisable one in a large number of the benign type. Then comes the cases where the uterus, because of excessive bleedings, or because it is totally prolapsed, produces annoyances which interfere with the patient's comfort and health, and in innumerable cases the uterus is removed. Now, if the uterus because it is present makes menstruation possible, whether it simply takes

part in this process, or, by some relation to the ovary and thyroid and pituitary stimulates this process, it is nevertheless certain that premenstrual and menstrual annoyances of the type which I have described are markedly diminished, if not entirely removed, when menstruation no longer recurs. Any procedure, whether it is thorough curettage or atmokausis, or the use of drugs or the x-ray, which will stop menstruation, without a too sudden cessation of ovarian function, benefits these patients. If none of these methods are of avail, and the patient's steady or recurrent annoyances are sufficient to make her life miserable, and if we feel, as I do, that removing the uterus and preserving the ovaries but not the corpora lutea will improve and cure this patient, then removal of the uterus, especially through the vagina, is a most legitimate operation.

Thyroid affections, occurring so much more frequently in women than in men, especially of the type of Basedow's disease or myxedema of typical character, teach us that the minor gradations of these diseases are also so much more frequent in women than in men. Hence, "nervousness" of a type in which the thyroid is the important factor, or only a contributing factor, are responsible for the fact that nervous conditions are so much more frequent in women than in men. Small wonder, then, that a goodly portion of women suffer from annoyances in which the thyroid and pituitary plays a part, preceding or during menstruation, a time at which the vast majority of women realize that they are put to a severe mental and nervous strain. I have attempted an explanation, theoretic to be sure, of the frequency of thyroid affections in women. I fail to see how logic can lead us to any other conclusion than that the susceptibility of the thyroid to disease is in a great measure due to the fact that its relation to other glands is an unstable one, and that it is hypersensitive to annoyances and irritations of whatever nature. Now, just as eclampsia, even if we haven't found the actual chemical element or elements which produce the tissue changes, is certainly due to the action of cells of the ovum, acting directly and through their effect on other glands, especially the pituitary posterior, the thyroid and the para-

thyroids, upon the blood and tissues of the body, so the ovary and the corpus luteum, directly or through other glands, act on the thyroid, and renders it liable to overactivity, underactivity, or malsecretion. When one considers the phenomena which lead to menstruation, it is impossible to avoid the conclusion that the uterus, by its very presence, and in all probability by elements secreted by its glandular structures, bears an important relation to the ovary, so that in the last analysis the thyroid acts on the uterus directly or through the medium of the ovaries, the uterus acts on the thyroid directly or through the medium of the ovaries or other glands.

Conditions due to hypothyroidism and to hypopituitarism are not so difficult to combat. It is the hyperthyroid and hyperpituitary cases which cause the trouble.

Ovarian residue helps dysmenorrhea due to corpus luteum. Suprarenal extract helps symptoms of a constitutional character due to hyperthyroidism. Placental extract and thyroid extract and ovarian residue and pituitary anterior benefit cases when the symptoms are due to hyperpituitarism posterior.

Local treatment and general medication can help many of these patients, even though the annoyances may recur at subsequent periods. I have watched some of these patients for nearly ten years, and many of them have responded repeatedly to periods of treatment.

Viewed from the standpoint of the medical man, it might be said that these are nervous patients made worse at the menstrual periods. The neurologist might think of them as neurasthenics, irritated by the premenstrual phase. Others might consider them as masked Basedow cases, subject to various degrees of exacerbation at regular intervals. My recent experiences show the posterior pituitary plus to play a part of the very greatest importance. The gynecologist was formerly inclined to attribute annoyances to reflexes sent out from displaced pelvic organs or from altered structural conditions.

As a matter of fact, it really means that the premenstrual phase furnishes us with an index of the patient's nervous sensitiveness, or shows us how stable is the function of the thyroid,

the pituitary, the adrenals, etc., or how sensitive they are to variations in the cyclic function of the ovaries, corpus luteum and the uterus.

It is the cases suffering from menorrhagia, plus these cyclic nerve upsets, that furnish the most marked indication for operative interference.

The annoyances which occur in the climacterium are of various forms. The nerve phenomena show variations from the phlegmatic type to the excitable type. The psychic variations run from melancholic and psychasthenic to manic forms. The annoyances are clearly the result of changes incident to the climacterium. In some they resemble various forms of mental diseases, and seem ofttimes to have nothing to do with the interglandular upset, but we know now that they have. It is of course necessary to recall the severe forms which are coincident with the preclimacteric or climacteric phase and the milder or severe forms which develop after the alterations of that period. Some women go through this time of life with scarcely a ripple to mar their good health, while others are miserable and unhappy for months or years.

There are women who are in this so-called change-of-life state (if that be used to signify an abnormal relation to and between the secretions) during the greater part of their life, or for certain months of their existence, or preceding a few or many or all of their menstrual periods, and who suffer from the same variations, in the way of annoyances, as the class just mentioned, who are about to go or are going into the climacterium. There is too much ovarian stimulation or too little ovarian secretion; there is too much thyroid actually or relatively or there is too little thyroid; there is a posterior pituitary overactivity or underactivity or an adrenal over or underactivity, or there is a play between these various alterations. Posterior pituitary overactivity is at this period productive of the largest number of physical and psychic annoyances.

CHAPTER XII

INSTINCTS AND EMOTIONS

We seem justified in believing that each kind of instinctive behavior is always attended by some emotional excitement, however faint, which in each case is specific or peculiar to that kind of behavior. (McDougall.)

McDougall defines an instinct as "an inherited or innate psycho-physical disposition which determines its possessor to perceive and to pay attention to objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object and to act in regard to it in a particular manner or at least to experience an impulse to such action."

Doctor and Mrs. Peckham say: "Under the term instinct, we place all complex acts which are performed previous to experience and in a similar manner by all members of the same sex and race."

Karl Groos goes so far as to say that "The idea of consciousness must be rigidly excluded from any definition of instinct which is to be of practical utility."

Every instinctive process has the three aspects of all mental process, the cognitive, the affective and the conative.

The innate, psycho-physical disposition may be regarded as consisting of an afferent, a central and a motor or efferent part.

"From the afferent part (nerve elements receiving elaborating impulses on sense organs), the excitement spreads over to the central part which determines the distribution of the nervous impulses, some of which descend to modify the working of the visceral organs (the heart, lungs, blood-vessels, glands, etc.). Others go to the central nervous system and extend to the efferent or motor part and influence the muscles which produce the instinctive action." (McDougall.)

While the afferent and efferent parts may be modified, the emotional excitement with the accompanying nervous activities

of the central part is the only portion of the total instinctive process that retains its specific character and remains common to all individuals and all situations in which the instinct is excited. The afferent element has inlets through any or all of the senses. And the same emotion may be excited through any of them.

Each sense impression may be presented again or reproduced in idea, and may therefore as a representation induce the same emotional excitement as was caused by the original impression.

Even delicate resemblances to the original impression or to its representation may have the same effect.

The Instinct of Flight and the Emotion of Fear.

Terror is the most intense degree of this emotion.

Instinctive flight is followed by equally instinctive concealment.

Fear is the great inhibitor of action, both present and future. Once roused it haunts the mind, comes back alike in dreams and waking life, bringing with it vivid memories of the terrifying impression.

Fear prompts to bodily retreat and tends to inhibit all other impulses than its own.

In certain mental diseases there is an abnormal excitability of this instinct. The patient is perpetually in fear. Shrinking in terror from the most harmless animal or at the least unusual sound and surrounds himself with safeguards to prevent impossible dangers. (McDougall.)

The Instinct of Repulsion and the Emotion of Disgust.

The impulse of this instinct is, like that of fear, one of aversion, and these two instincts together probably account for all aversions except those acquired under the influence of pain.

While the impulse of fear prompts to bodily retreat, the impulse of repulsion prompts to removal or rejection. The first impulse of repulsion is evidenced by babies. The mouth rejects because of odor or taste. The other impulse of re-

pulsion is excited by the contact of slimy or slippery substances with the skin,—hence shrinking and a creepy shudder.

THE INSTINCT OF CURIOSITY AND THE EMOTION OF WONDER.

It is not always easy to distinguish in general terms between the excitants of curiosity and those of fear, for one of the most general excitants of fear is whatever is strange or unfamiliar. This instinct exhibits great individual differences; the impulse grows weaker for lack of use in those in whom it is innately weak; it becomes stronger through exercise in those in whom it is innately strong. In the latter type it may become the main source of energy and effort. *It is one of the principal roots of science and religion.*

THE INSTINCT OF PUGNACITY AND THE EMOTION OF ANGER.

"This instinct is apparently lacking in the constitution of the female of some species. In the animals the most furious excitant of this instinct is produced by hunger; and in the male of many species by any interference with the satisfaction of the sexual impulse. *Such interference is the most frequent occasion of its excitement.* The obstruction of every other instinctive impulse may in its turn become the occasion of anger. The man devoid of the pugnacious instinct is not only incapable of anger but lacks this great source of reserve energy called into play by difficulties. It is the opposite of fear which tends to inhibit all other impulses than its own." (McDougall.)

THE INSTINCT OF SELF-ASSERTION OR SELF-DISPLAY AND THE EMOTION OF ELATION OR POSITIVE SELF-FEELING.

"Many children clearly exhibit the instinct of self-display. The instinct may find expression in boasting and swaggering, vanity, etc. This instinct is excited by the presence of spectators to whom one feels in any way superior. In certain mental diseases, especially in the early stages of general paresis, the exaggeration of this emotion and its impulse of display is the leading symptom. There is a perpetual state of elated self-feeling and the behavior corresponds to this emotional state. The individual boasts of his strength, his immense wealth, his

good looks, his luck, his family, when perhaps there is not the least foundation for these boastings."

THE INSTINCT OF SELF-ABASEMENT OR SUBJECTION AND THE EMOTION OF SUBJECTION OR NEGATIVE SELF-FEELING.

The instinct of this impulse exhibits itself in a slinking, crestfallen behavior, a general diminution of muscular tone, slow restricted movements, a hanging down of the head, and sidelong glances. In children the expression of this emotion is often mistaken for that of fear. In many cases of mental disorder we observe the exaggerated influence of this instinct. The patient shrinks from the observation of his fellows, thinks himself a most wretched, sinful creature, and in many cases develops delusions of having performed unworthy or even criminal actions. Many such patients declare they are guilty of the unpardonable sin, although they do not attach any definite meaning to the phrase. The patient's intellect endeavors to justify the persistent emotional state which has no adequate cause in his relations to his fellow men. (McDougall.)

THE PARENTAL INSTINCT AND THE TENDER EMOTION.

The human species is dependent on this emotion for its continued existence and welfare. This is the most powerful of the instincts, and is accompanied by a strong and definite emotion. This instinct and its emotion are weaker in man that in woman,—in some men altogether lacking. The philosophers as a class are men among whom this defect of native endowment is relatively common. Its impulse is primarily to afford physical protection to the child, especially by throwing the arms about it. The impulse being essentially protective, *its obstruction promotes anger, perhaps more markedly than the obstruction of any other.*

The intimate alliance between tender emotion and anger is of great importance for the social life of man. In those women in whom the instinct is strong it is apt to be excited owing to the subtle working by any and every object that is small and delicate,—as a small cup, or chair, or book, etc.

THE SEXUAL INSTINCT OR THE INSTINCT OF REPRODUCTION.

This instinct more than any other lends the immense energy of its impulse to the sentiments and complex impulses into which it enters while its specific character remains submerged and unconscious.

Sexual Jealousy and Female Coyness.

The specially intimate innate connection between the instinct of reproduction and the instinct of pugnacity account for the fact that the anger of the male is so readily aroused by any threat of opposition to the operation of the sexual impulse. The coyness of the female is due to the fact that the instinct of reproduction has intimate innate relations to the instincts of self-display and self-abasement. (Lack of adrenal cortex and cells of Gley.)

THE GREGARIOUS INSTINCT plays a great part in moulding societary forms. It implies an uneasiness in isolation and satisfaction in being one of a herd. This instinct is commonly strongly confirmed by habit. The morbid intense working of this instinct is known as agoraphobia. The patient will not remain alone; will not cross a wide empty space; seeks always to be surrounded by other human beings. Professor James said of the normal man, "To be alone is one of the greatest of evils for him." Solitary confinement is by many regarded as a mode of torture.

THE INSTINCT OF ACQUISITION.

The instinct or the impulse of collecting and hoarding, when habitually exaggerated, leads to miserliness and kleptomania. This instinct ripens naturally and comes into play independently of all training.

THE INSTINCT OF CONSTRUCTION: This instinct is evidenced in the playful activities of children; the simple desire to make something rooted in this instinct is probably the contributing motive to all human construction from a mud pie to a metaphysical system or a code of laws.

THE THREE MOST IMPORTANT OF THE SO-CALLED PSEUDO-INSTINCTS ARE SUGGESTION, IMITATION, AND SYM-

PATHY. Professor James has said "sympathy is an emotion." The sympathetic induction of emotion is displayed in the simplest and most unmistakable fashion by all gregarious animals, as in the spread of fear and its flight impulse among the members of a flock or herd.

Laughter is notoriously infectious all through life, and this affords a most familiar example of a sympathetic induction of an affective state. Sympathetic sensibility leads many people to avoid all contact with distressful persons, books, or scenes, and to seek the company of the careless and gay. (McDougall.)

SUGGESTION AND SUGGESTIBILITY.

Suggestion is the process of communication resulting in the acceptance with conviction of a communicated proposition in the absence of logically adequate grounds for its acceptance. The measure of suggestibility is the readiness with which propositions are accepted. The conflict between the two impulses of submission on the one hand and of self-assertion on the other produces the complex emotional disturbance known as bashfulness. In so far as the impulse of submission predominates, we are suggestible toward the person whose presence evokes it. Children are inevitably suggestible.

CONTRA-SUGGESTION: This denotes the mode of action of one individual on another which results in the second accepting *in the absence of adequate logical grounds the contrary of a proposition asserted or implied by the agent.* There are persons with whom this result is very liable to be produced by any attempt to exert suggestive influence, or even by the most ordinary and casual utterance. Some children display this contra-suggestibility very strongly for a period, and afterward return to a normal degree of suggestibility. But in some persons it becomes habitual or chronic; they take a pride in doing and saying nothing like other people, in dressing and eating differently, in defying all the minor social conventions. Contra-suggestion seems to be determined by the undue dominance of the impulse of self-assertion over that of submission, owing to the formation of some rudimentary sentiment of dis-

like for personal influence, *resulting from the unwise exercise of it.*

From these seven instincts, together with feelings of pleasure or pain and feelings of excitement or depression, are combined practically all the affective states that are popularly recognized as emotions. (McDougall.)

The Instincts, the Emotions, and the Endocrines

Just as the newly-born inherits facial resemblance and innumerable physical and other characteristics and traits, so too is it born with instincts which, though common to all, are certainly inherited in varying degrees of intensity and combination along Mendelian lines. "Nature," the endocrine glands, the type of life, sanitary conditions, food, intercurrent diseases, etc., influence and may determine the type of physical and mental growth. Hunger, internal processes, and environment furnish the first stimuli which act on the instincts and result in emotions. Training, instruction, education, changes of a physiological and pathological nature enter into play and the result is the developing boy or girl who continues through life still acted on and affected by the same, or by altered types of internal and external influence. What is in a person is shown by his behavior. The behavior of animals, of the newly-born and of the young has informed us about instincts, and their expression in humans leads to emotions and subsequently plays an important rôle in disposition and character. We inherit our instincts, our emotions, and our endocrines.

People are well and healthy, or ill and sick. They are normal or neuropathic. They are normal or psychopathic. People may be cheerful or morose "by nature," as we call it; energetic or lazy; yielding or stubborn; full of ambition or indifferent; sweet or sour; they may have been one and have become the other. Some people are courageous, others are cowardly; some have been one or the other, and events and accidents may modify these qualities temporarily or permanently. A well person may become ill, an apparently normal

person may become neuropathic or psychopathic. An individual may have been practically well always or more or less ill always. But endocrine action is the dominating factor.

Practically every adult who dies would show at autopsy an evidence somewhere of a previous tuberculous lesion. The vast majority never develop real recognized tuberculosis in any form; others develop it in a recognized form in glands, bones, joints, kidneys, lungs, etc.

If we understand the body and its ills, we seek to correct them medically or surgically.

Do we understand and study the mental and psychic make-up and mental reactions sufficiently to realize the numerous gradations between the normal mind and psyche and the gross abnormalities of either? Language shows that we should. We say "peculiar," "temperamental," "odd character," "nervous type," "hysterical," "rolling-stone," "weak character," "neurasthenic," "eccentric," without realizing sufficiently that, while we are referring to characteristics and traits, we are concerned with psychic conditions differing from the average or the normal. In fact, adjectives prove in language the purpose or intention of defining differences of any sort. Endocrine action is the dominating factor also.

The average mind recognizes the distinction between extremes; but unless trained or inherently analytical, it grasps less readily the intervening gradations. The medical mind is taught the symptoms of disease along the same lines, yet observation proves that there are gradations or variations in the intensity of practically all the body ills. The medical man knew a typical Basedow's disease when he saw it, but it has taken fifteen or more years to absorb the knowledge that there are variations in intensity down to what are now recognized as the milder forms of hyperthyroidism. The physician was taught to diagnose a well-defined case of myxedema; he now recognizes even a mild or occasional hypothyroidism. Everyone knows that from the extreme pulmonary tuberculosis, incurable and fatal, there are gradations down to the mild, incipient form which may often be recognized only by the most

expert, and that too only with the aid of the most modern technical apparatus.

Everyone knows that epidemics of influenza may be not only of varying degrees of severity, but that they produce symptoms varying from the severest forms of pneumonia and psychoses to simple slight indisposition. And so throughout the whole realm of medicine, our knowledge is brought to us by the study of the extreme types, because from them we receive the imprints which focus our attention on the various major and also minor details, and it is only by the recall of many seeming details that we can diagnose the incipient stages of many of the physical, mental, and psychic ills.

Therefore, to secure a knowledge concerning the endocrines and their importance, and to be able to recognize their gradations, pointing to their over- and under-activity, we must study some of the endocrine diseases in their extreme form, retaining a clear picture obtained not only through the eye but through the recognition of all the smaller manifestations. It is not sufficient to consider Basedow's disease, for instance, as simply exophthalmos, goiter, tachycardia, and tremor; one must know the innumerable changes in almost every function of the body associated with this disease, the study of which has taught us that most valuable pathology which the dissecting table or the pathological laboratory is unable to supply. On the other hand, the pathologist, both in his gross pathology and in his microscopic work, has furnished us and will still further furnish us with a knowledge as to which of the glands, what parts of the glands, and what character of changes are the responsible seats or factors for those diseases and abnormalities and symptoms with which we have to deal.

Those most worthy and insufficiently recognized investigators who have experimented on animals have contributed a huge and most valuable quota to our knowledge of the physiological action of the endocrines and the specific effects which the endocrines produce on various organs, structures, and functions of the body. The alienists and the psychiatrists have given us a knowledge of the manifestations and symptoms of

mental disease and are continually finding and unraveling the mysterious and wonderful functions of brain areas, centers, and structure in their relation to mental and psychic processes.

The neurologists, let us forget the Freudians, by delving into the hidden and often forgotten accidents and into the resulting effects and impressions of life and experience, expose the tremendous inuflence, not only of the conscious but of the subconscious.

Psychologists, by their study of the primitive and inherent instincts and resulting emotions, have exposed to us the knowledge that different beings react to different stimuli according to laws often as fixed and as specific as the reaction of chemistry and the laws of physics. *But here we do not grant readily enough the association of endocrine activity with the emotions and the instincts, the most important point of all.*

The resemblance of a new-born infant to either of its parents or grandparents is due to the fact that a like endocrine action has taken place along the phase of body-development. If a child resembles either of its parents or its grandparents in instincts, emotions, mind, and psyche, it is because a like endocrine action has taken place in the two. Twins born in the same sac have developed from the same fecundated ovum which, after its first cell division, allowed each of these two halves to develop as an independent ovum. Hence such twins are alike in sex, in appearance, in characteristics, in nature, etc. Twins which have developed from two different ova are in two separate sacs and may be, and usually are, as unlike as any two children of the same parents born at different times. When people totally unrelated resemble each other, it shows that they are the products of like endocrine action and relation. If they resemble each other in disposition, traits, and character it shows that they possess corresponding and similar endocrine activity. When people are peculiar and abnormal any who have the same deviations from the normal suggest that like or similar endocrine activity has taken place in either. When individuals have a psychosis of any definite distinct type and their symptoms are alike it suggests the

same disturbance of endocrine action and interplay in two totally unrelated individuals endowed with like instincts and emotions. When individuals having the same type of psychosis react in the same way in their attitude and show more or less the same psychic elements of reaction one is justified in regarding their endocrine interplay as approximately the same. Therefore resemblances in body, form, or in features or in ability or in character or in mind or psyche are important to the physician in attracting his attention to the fact that many people who resemble each other or look alike may be and often are alike in other respects.

It is only by a bringing together of the most essential and varied points brought to our knowledge by the scientists and investigators in the fields above mentioned that a physician can obtain a sufficiently comprehensive and amalgamated knowledge of the human being as a whole.

Then comes the question of what to do and how to do it in the best possible manner. So far as the endocrines and therapy by endocrines is concerned, exact knowledge as to indications for administration and as to the value of the different gland extracts can be obtained only by their use by the human being, however much experimentation on animals may have taught us. Therefore to equip oneself adequately for endocrine therapy, these gland extracts must be tried, as they are being tried and will be tried in a continually increasing field of endeavor; each specialist of necessity studying gland psysiology, pathology, and therapy in its more particular relation to his field of work. Let me say here that for years 90 per cent. of all my medication has consisted of endocrine extracts.

To initiate endocrine therapy properly in gynecology, one must attempt the study of the relation of the endocrines to the physiological functions of woman in the varying periods of her life; and must continually study the possible relation of deviations of glandular activity to many of the pathological, physical, mental, and psychic manifestations with which he has to deal. And this holds true for children as well as adults. And right here, so far as our children are concerned, is the

most important field for therapy. Therefore many of the associations between glandular abnormality and pathological states are at first only suggestive as to cause and effect. But, if these seeming coincidences occur sufficiently often in one's practice, the suggestive becomes the probable; and the more frequently does it repeat itself, the more nearly does it approach a fact.

A comprehensive study of the endocrines in general is an ever increasingly huge task. One may take up this study for the sake of individual pleasure and find in it a worthy reward; but most of us have entered into the study of this all absorbing question because it seemed to furnish us not only with an explanation for many phases which seemed puzzling, but because it offered a prospect of supplying the means by which we might benefit our patients. A man may be a very good physician and yet have forgotten ninety per cent. of all the anatomy studied so laboriously and with so much drudgery in our medical schools; a man may read the entire literature of the endocrines and forget ninety per cent. and still retain the essential points and factors which particularly interest him, especially from the practical side. But he can gain a proper understanding of the problem only by observing therapeutic results.

When I was a student of medicine, Professor Allen Starr showed a case of myxedema, typical in appearance, one never to be forgotten. The patient was a school teacher who had left England because her memory had failed her; her mental faculties had changed so that her vocation could not be pursued. I remember with what glee and confidence he told us that the patient could be cured, now that we were no longer feeding with the gland itself but were giving a glycerin extract; and not long thereafter thyroid extract was used therapeutically and I have used it ever since.

I remember a clinic of Professor Delafield's, when he showed a big, broad-shouldered, powerfully built stoker complaining of palpitation of the heart. After a thorough examination, he said in words that I have never forgotten: "This is

a case of exophthalmic goiter without exophthalmos and without goiter." The meaning of that diagnosis has influenced me ever since, and early in my gynecological practice I studied my cases and published a large series under the title, "Associated Nervous Conditions in Gynecology," the main purpose being to show that hyperthyroidism was a most frequent cause of these nervous conditions, and that it existed without the so-called pathognomonic signs of Basedow's disease.

Nearly twenty years ago Knauer made those interesting transplantations of ovaries in animals which proved that the ovaries exerted their trophic action on the genitalia by virtue of a secretion and not by a reflex promoted by ripening of the follicles. Since that time I have been using ovarian secretion (corpus luteum much less frequently than the whole gland), and later the secretion of the interstitial substance, both by mouth and by hypodermic; and with every year the results in an ever widening series of appropriate cases are more than gratifying.

Several years ago came the introduction of pituitrin into obstetrics, calling attention to the relation between a gland seated in the brain and an organ so distant and so special in its activities and functions as the uterus. Cushing's work deserves the highest praise, aside from his surgical accomplishments, because his reports of cases contain references to the effects of the pituitary diseases on menstruation; and the frequent references to associated thyroid anomalies and adrenal anomalies have done so much to focus our attention on what are now called pluriglandular or polyglandular involvements; that is, the fact that a severe change in one important gland influences or is associated with changes in associated glands. But an added feature is the photographs of patients in their earlier periods before a pituitary disease began to be manifested; and the photographs of the same patients at the time of operation. Could anything be more instructive than the study of the changes in facial contour, growth of the facial bones, changes in the jaw, in the teeth, in the hands, etc.? As-

sociated therewith are the changes in metabolism and in the mental attitude, the psychic sphere.

As a result of such study one is able to note by observation of the face alone, the existence of a well-defined endocrine over- or under-activity or alteration. One may see and thus recognize the slighter changes produced by the influence of like secretory activity. No one finds any difficulty in recognizing a well-defined case of Basedow's disease or acromegaly or myxedema at sight. Between these extreme resemblances and types and the so-called minor or latent forms there are gradations of varying degrees which may still be recognized by the eye. This recognition directs our attention to over- or under-activity of a gland or glands through the suggestive resemblance. Add to this the knowledge we have gained concerning the influence of the endocrines on texture of the skin, distribution of hair, dryness or moisture of the skin, character and development of the teeth, pigmentation, feeling of physical and mental languor, asthenia, the meaning of blood pressure, sugar tolerance, rate of the pulse, etc., and it is easy to recognize how hugely our diagnostic acumen has been furthered.

In diagnosis it is no longer a question of bimanual examination, of listening to the lungs, to the heart, testing the blood-pressure, examining the urine, examining the blood, etc. It is a matter of observation and also of tests to determine what the endocrines have been doing to a patient before she comes to us; and then it is for us to determine what the endocrines are doing at the time the patient consults us; and if the patient suffers from too little of a secretion necessary to her well-being, what is easier than to administer it? And if she be suffering because of an excess of any one or more secretions, what better outlook has medicine than to search for and find, if possible, the counteracting remedies?

Now, when patients come to the gynecologist, not all are to be helped by surgical means or by surgical means only. A goodly proportion of them come because of disturbances associated with menstruation. Here we have the various degrees of amenorrhea, dysmenorrhea, menorrhagia, and metrorrhagia.

Not all the menorrhagias and metrorrhagias are due to polyps or fibroids of the uterus. A very large number of fiboids have no menorrhagia or metrorrhagia as a symptom. If we can hold out hope of a cure for these patients with medication, why should we dilate or do a plastic on the cervix, or curette? How is a patient, suffering from repeated miscarriage, to be benefited by the removal of the uterine lining when examination shows it to be smooth and normal?

Then we have the annoyances which precede each menstruation, of which patients complain so frequently; we have the annoyances associated with the climacterium and menopause. Not always are climacterium and menopause coincident. Many patients believe that long periods of nervous upset, headaches, etc., must be due to some anomaly in the genital tract. This notion seems to be general among the laity, and it is only too true that gynecology of the past few decades has assisted in fostering it. Hence the mania for doing a trachelorrhaphy to correct all sorts of symptoms supposedly reflex and supposedly due to this, in my opinion, unimportant cervical condition. Slight deviations of the uterus have been corrected in thousands of cases for the same purpose.

It was because of my disbelief in this etiology and my disinclination to advise surgical procedures against my belief that my attention was directed still more definitely to aberrations of the endocrine system as scientific and logical explanations for those varying neuroses and psychoses erroneously called "hysteria" and "neurasthenia." The extent to which hyperthyroidism and hypothyroidism, for instance, are now made as diagnoses for many of the annoying symptoms formerly called, and indiscriminately so, "hysteria" and "neurasthenia," is only one of the many proofs of the correctness of this belief.

Endocrine abnormality may focus its effect on a definite point or function. An affection of a gland causing either a plus or a minus reaction may therefore evidence itself by totally different symptoms. For instance, diminution of hypophysis activity may result in a typical dystrophia adiposogenitalis.

In another patient there may be diabetes insipidus, in another amenorrhea without adiposity. The hypophysis, when hyperactive, may produce acromegaly, dysmenorrhea, metrorrhagia, fibromyomatous growths, fibrosis uteri, an exaggerated metabolism resulting in a glycosuria, or the symptoms may be of a general nature associated with excitability or irritability of the type called "hysterical."

It is most important to judge the endocrine processes of an individual at any age from childhood up, and to determine their influence on, and association with, instincts, emotions, mental and psychic reactions. All deviations from the standard in body characteristics are due to over- or under-activity of the various endocrines or to the numerous and innumerable possible variations in their interrelation. Normality and abnormality of any of the factors concerned with a child or adult are due to heredity and to inherited instincts and emotions plus the play of the endocrines.

Normally a definite balance should exist between the interstitial and glandular structures of the ovary; between the anterior and posterior pituitary, between the adrenal cortex and the medulla. The balance, as well as the activities of the respective structures represented in this balance, differs in the two sexes, with the testis as the male gonad.

The anterior pituitary is vitally concerned with body growth and mental development. It is associated with strength, large or broad hands, the development of the jaws (we speak of a firm lower jaw), with maturity of mind, etc., and its function is more in evidence in men than in women.

Speaking in relative terms and in view of its relation to the posterior pituitary it is a male gland just as relatively speaking the thyroid is a female sex gland.

The posterior pituitary related to the uterus and genitalia (pituitrin, for instance) plays relatively a greater rôle in its balance with the anterior lobe, in women than in men. Its action is associated with the tender emotions and with the sex instinct in women; and so far as the tender emotions are concerned plays, of course, a much more important normal rôle

in women than in men. Relatively speaking, it may be called a female gland. It is related to fears, phobias, states of anxiety, etc.

The adrenal structures are related to the instincts of flight and pugnacity and to the corresponding emotions of fear and anger. The adrenal cortex is concerned with the production of hair and exerts normally a greater influence in many phases in the male than in the female. Good adrenal action (cortex and medulla) is essential to courage. Poor adrenal action, especially a lack of balance between the cortex and medulla wherein the cortex plays the minor rôle, is responsible for the emotions of fear, for cowardice, for anxiety. The adrenal cortex is more of a male than a female portion of the gland. The medulla, since it is more predominant in women, is therefore partly responsible for their being more "emotional," as we call it.

The ovary is closely related to the posterior pituitary and to the adrenal medulla. This combination is responsible for the characteristics of coyness and self-display. She is not the aggressor in the sense of the hunter and fighter, she is the one who is sought. Since the anterior pituitary is less active, that maturity of mind and what we call wisdom, greatly dependent on anterior pituitary action, are less marked, and men have produced the greatest philosophers.

The male gonads are responsible for the sex urge, stimulate the adrenal cortex and the anterior pituitary more than do the ovaries in women. There are, therefore, numerous indications for the administration of the corresponding extracts in those states due to lack of sufficient ardenal cortex or anterior pituitary activity. Hence man is the fighter and the hunter, his sex instinct is much stronger, he is the aggressor and seeks the woman.

There is in woman no such mechanism producing the consciousness of sex urge as man has in the testis, vas deferens, and seminal vesicles. The combination of testis and adrenal cortex makes man more brutal, more criminal and more coarse. It is the normal action of the anterior pituitary which is con-

cerned with that cerebral trophic stimulation and with that maturity of mind and with that judgment which in most men act as restraining factors to the coarser instincts. A normal associated action of the posterior pituitary has a like moderating action, and if it be excessive in men, even though it does not overbalance the action of the anterior pituitary, such men are more or less emotional, have tender feelings, are fond of children, etc.

The thyroid is the great activator. According to its action it stimulates, understimulates or overstimulates any of the functions, instincts, or emotions of the human being. It is much less stable and much more frequently overactive in women than in men. It is the great fixer of impressions for all things in the sphere of memory, especially for all things not associated with those instincts and emotions which are specifically associated with the activity of other endocrines.

CHAPTER XIII

MENTAL AND NERVOUS DEFECTS

"It is calculated that some 250,000 people in the United States are insane. One of every five men discharged from the U. S. Army for disability is discharged because of insanity, 60 per cent. of the cases being dementia precox."—Lewellys F. Barker.

The mechanism of mentality may be faulty from the beginning or it may be made faulty by bad environmental conditions.

The records of insanity, imbecility, feeble-mindedness, and other forms of nervous and mental defects are truly startling. In general, insanity is a *degenerative* process. It is questionable if there is a single genuine case on record where a normal child has been borne from a union of two imbeciles. (Guyer.)

Dr. Charles Gorst, Superintendent at the Mendota Hospital, says: "No one doubts for a moment that defective mental conditions are transmitted from parent to child as surely as the physical defects and deformities."

One serious drawback in making a study of inheritability in insanity and other nervous disorders is that so far we have dealt mainly with mass effects rather than specific neuroses. But when the latter is attempted we are confronted by the fact that there are various intergradations of the recognized types of defects, that because of varying degrees of defect in the same type a standard is hard to establish, and that, above all, what appears as a specific mental malady in one individual may crop out in his descendants in an entirely different guise.

Feeble-mindedness vs. Insanity.

Authorities make a sharp distinction between insanities on the one hand and feeble-mindedness on the other. According to Goddard, not only is there no close relationship between the two conditions, but in reality they stand at opposite ends of the psychical scale. In general, insanity is a *degenerative* process, whereas *feeble-mindedness is an arrest of develop-*

ment. In the first case the victim loses *part of the mentality he once had,* in the second he stops short of normal development. (Guyer.)

The commonest manifestations of insanity are undue depression, apathy, excitement, instability, obsessions, hallucinations, and delusions.

In general, there is more doubt about the inheritability of some of the insanities than about cases of mental deficiency. A neuropathic person who manifests certain anti-social activities is sure to be classed as insane, whereas another individual with the same diathesis in a less degree might pass unrecognized. It is almost impossible in some instances to tell just where the border line between a neuropathic and a normal constitution lies. Many of the idiosyncrasies of the insane indeed are merely exaggerations of characteristics seen in normal people. Recent studies of the psychology of the insane show that most of their hallucinations and delusions are closely related to some previous mental experience they had before becoming insane. *And it has been found that the surest means toward removing the obsessions of the patient in curable cases is to ferret out these earlier experiences and correct the wrong impressions concerning them.* Certain critical periods of life, such as puberty, pregnancy, and the close of sexual life, are particularly likely to test out the mentally unstable, although such individuals may have maintained normal mental balance up to the crisis in question. (Guyer.)

Manic depressive psychoses and dementia precox, in the order named, represent the largest number of admissions to hospitals for the insane.

Kraepelin states: "The psychopathic charge of a family may reveal itself not only by the appearance of mental disorders but also by other forms of manifestation. Here belong, before all, those diverse slighter deviations from mental health which go to make up the border-line of insanity: nervousness, states of anxiety and compulsion, constitutional depressions, slight hysterical disorders and forms of feeble-mindedness, tics; also odd characters, peculiarities in modes of living, criminal

tendencies, lack of self-control, intemperance, love of adventure, mendacity, suicide on an inner basis."

Church and Peterson, in Nervous and Mental Diseases, state: "In determining the factor of heredity we must not be content with ascertaining the existence of psychoses in the ascendants, but must seek by careful interrogation of various members of the family for some of the hereditary equivalents, such as epilepsy, chorea, hysteria, neurasthenia, somnambulism migraine, organic diseases of the central nervous system, criminal tendencies, eccentricities of character, drunkenness, etc., for these equivalents are interchangeable from one generation to another, and are simply evidence of instability of the nervous system. It is the unstable nervous organization that is inherited, not a particular neurosis or psychosis."

A number of psychiatrists and investigators of the inheritance of insanities (Rudin, Lunborg, Davenport, Rosanoff, Jolly) concur in the opinion that manic-depressive insanity, dementia precox and allied psychopathic conditions tend to occur after the manner of a Mendelian recessive. On the other hand, such maladies as Huntington's chorea are transmitted as a dominant and in all probability at least half of the children of an afflicted individual will inherit and manifest the defect. As Dr. Wilmarth says: "Mental accident may occur in any family, but it is rarely that a second case occurs unless there is a tendency to nerve degeneracy."

Grades of Feeble-Mindedness.

As to the various grades of feeble-mindedness, while no sharp lines of demarcation can be drawn, a rough and ready test usually applied is the relative ability of such subnormal individuals to take care of themselves. In all, the conditions exist from birth or shortly after. *Idiots* are such defective individuals as are unable to take care of themselves even in the matter of guarding against common physical dangers. Their mentality does not progress beyond that of a two-year-old child. *Imbeciles* are able to take care of themselves in the cruder physical ways, but are unable to earn their living. Their

mental age ranges from three to seven years inclusive. *Morons,* or the "feeble-minded," in a more specific usage of the term, can under proper direction become more or less self-supporting, but they are, as a rule, incapable of undertaking affairs which demand judgment or involve unrestricted competition with normal individuals. Their intelligence ranges with that of children from seven to twelve years of age. The last class grades up insensibly into the shiftless, ne'er-do-well types which exist in every community. It is the hordes of the feeble-minded in the restricted sense that afford our most serious problems today. The idiot and the imbecile are usually early and easily recognized and kept more or less under restraint, but the higher grades of feeble-minded, the so-called moron type, can be detected often only by carefully devised tests. (Guyer.)

All facts point to the conclusion that most mental deficiency is strongly inheritable and that the majority of our defectives of this type come from degenerate stocks.

"We now know that 65 per cent. of these children (Goddard, Vineland, N. J.) have inherited the condition and that if they grow up and marry they will transmit the same condition to their offspring. Indeed, we know that this class of persons is increasing at an enormous rate in every community and unless we do something to stop this great stream of bad protoplasm we shall some day be swamped in a sea of degeneracy."

Dr. A. C. Rogers, Superintendent of a school for feeble-minded in Minnesota, says: "We have no survey of mentality in this country except in very small areas, but probably about 65 per cent. of the feeble-minded children that we know of are feeble-minded from heredity; that is, they come from families in which there is much feeble-mindedness, usually associated with various neuroses or psychoses. There are about 35 per cent., approximately, that are acquired cases.

On the other hand, as our data show, there remain about *one-third of the mentally deficient to be accounted for on other than a basis of heredity.*

Mongolianism does not seem to be hereditary, although it is usually congenital.

Wilmarth says: "Epilepsy and mental deficiency are as closely related as branches on the same tree. So small a percentage of epileptics maintain normal mental actions as hardly to be worth consideration, even those who retain a normal mind in the early stages of the disease almost infallibly become imperfect later."

Goddard, one of the best authorities on the heredity of feeble-mindedness, is inclined to regard the condition as a unit character, "due either to the presence of something which acts as an inhibitor, or due to the *absence of some stimulus which sends the normal brain on to further development.*"

Supposing nervous defects finding expression in feeble-mindedness, epilepsy, and related conditions, to act as a Mendelian recessive, then the marriage of one such defective with another should yield only mentally enfeebled offspring. How nearly this expectation may be realized is seen from the following examples: In an extensive study of Feeble-mindedness, Dr. Henry H. Goddard points out that out of 482 children with both parents feeble-minded, all but six were feeble-minded. (Guyer.)

Davenport points out that not infrequently two deaf-mutes whose defects are due to different causes may have normal children.

A mating between a feeble-minded person and one of perfectly normal stock will apparently result in normal children, although they will be carriers. There is some evidence, however, that such carriers may occasionally show "taints" of abnormality in the form of migraine (nervous sick headaches), alcoholism, queerness, violent temper, etc.

There is considerable evidence that many apparently normal individuals of our average population are in reality carriers of some form of neuropathic defect, some authorities placing the proportion provisionally at over thirty per cent.

Importance of Early Diagnosis of Insanity. (Guyer.)

Most of the insane who recover usually do so within a

few months of their first alienation, hence *the importance of losing no time in detecting the condition and securing early treatment.* It is now well-known that many cases of chronic insanity may be measurably improved under the care of a psychiatrist by systematic re-education, especially in industrial lines.

There is little doubt that the tendency is to under-estimate rather than over-estimate the factor of heredity in insanity. Many cases said to be "caused" by mental strain,—such as those occasioned by domestic infelicities, business reverses, and the like,—should in all probability be fundamentally attributed to something far more deep-seated than the more obvious cause. In many such instances there is little doubt that an inherent weakness in mental make-up exists which predisposes the individual toward mental breakdown.

Undoubtedly certain *infectious diseases,* arterio-sclerosis, various poisons in the blood, child-birth, and similar influences often enter as contributory factors.

CRIME AND DELINQUENCY.

While there is no longer a reasonable doubt about such nervous disorders as epilepsy, feeble-mindedness, and certain forms of insanity being rooted largely in ancestral taints, the degree to which crime or delinquency is based on heredity is far more questionable.

Beyond doubt a considerable proportion of crime and degeneracy is due in a large measure to innate inclination, but with just as little doubt much is the effect mainly of vicious habits acquired through an unwholesome environment.

The conviction is steadily growing among students of heredity that a considerable amount of crime, gross immorality and degeneracy is due at bottom to feeble-mindedness and that, therefore, if we can once eliminate feeble-mindedness these vicious accompaniments will at the same time in equal measure disappear. Goddard is convinced that a large proportion of the delinquent girls who fill our reformatories are actually feeble-minded. They are often the higher grade or moron type, and their mental condition remains unsus-

pected because they have never been thoroughly tested in this respect. One great difficulty in identifying the high-grade morons who are a bountiful source of our criminals is our almost universal failure to recognize that *a memory test alone is not sufficient to determine the mental responsibility of an individual.*

Davenport: "We have certain methods of testing whether it is bad environment or bad breeding which produced these people. Some of the children have been taken at an early age and 'placed out.' We have traced their subsequent history. In most cases they have turned out well, but it is also true that some of the children who remained at home in bad environment turned out well."

Wilmarth: "In no place is this subject of the power of heredity in relation to environment so easily studied as among our children. A group of many little children came to us from the state school, being untrainable there. Each one has lived, eaten, and slept among the others, and, so far as we know, with but one exception, those of vicious parentage have turned instinctively to vicious traits by preference, while those of simple but honest stock *do evil things only under strong temptation, and do not persist in them after the wrong is pointed out.*"

Healy: "Such factors as immorality or *constant quarreling of parents,* bad companions, lack of parental control, defective sense organs, debilitating habits, *lack of healthy mental interests,* and a host of other environmental factors are not infrequently sufficient in themselves to develop delinquency in the absence of inherited deficiency."

Karl Pearson concludes *"that it is a conservative estimate to regard heredity as at least five or ten times as important as environment in the development of the individual."*

CHAPTER XIV

MENTAL DEFICIENCY AND CRIMINALITY

(Schlapp)

Four hundred years ago, no less a thoughtful and scholarly personage than Martin Luther recommended that a twelve-year-old child be drowned and asked that prayers be offered to cleanse its soul of a devil. Coming nearer to our own time, our Puritan ancestors burned scores of persons so unfortunate as to be believed possessed of devils.

We know now that the child who almost fell victim to Luther's ignorance, and many of the persons burned by our forefathers as witches were guilty of no worse offense than feeblemindedeness. We look back with wonder on the ignorance of these times; but our own attitude as evidenced by our present unenlightened methods of dealing with mental defectives, particularly those whose defectiveness has taken a criminal trend, shows in us a pitifully slow evolution in ascertaining the causes of abnormality in human beings.

We still judge criminals and delinquents by their acts alone and to a large extent dispose of them legally on this basis. The general public, and even the courts, believe that a person of normal intellect can control his actions and, consequently, that the actions of any person of normal intellect are premeditated, or at least controlled completely by the intellectual mental make-up, and that therefore the person is responsible.

In the light of well established facts, known to psychiatrists for the last half century, this method of placing responsibility for criminal acts is basically erroneous and should be revised. We must learn to comprehend many abnormal classes hitherto unrecognized by society as subjects for study, control or aid.

There is no question of altruism involved; a proper understanding and attitude toward these people who have no innate power of adjustment to their environment will make every home and family more nearly safe, the state's taxes will

be lessened and future generations will be infinitely better equipped for the struggle of life. Too much stress cannot be laid on the broad scope of influence which mental defectives exercise on everyday affairs and the consequent tremendous interest the problem should have for "the man on the street."

You are acquainted—perhaps too well—with the boy who, surrounded by an affectionate family in a home of ease, runs away repeatedly, undergoes unnecessary hardships and when brought back can never give any explanation for his acts except that he "just wanted to get away." You doubtless also have come into contact with those other well-known types of juvenile delinquency—children who lie and practice petty thievery from their earliest years, later forge checks and generally involve their families in serious situations, and in whose genealogical history there is no discernible trace of family propensity for similar actions. There is also the brilliant youth with every promise of success and an intellect capable of splendid achievement, who never quite gets a grip on himself, who follows the line of least resistance, becomes a drifter and eventually is classed as a confirmed failure.

In another class are the thousands of tramps, possessing what is commonly termed an aversion to work, who form an almost alien stratum of society, useless to themselves, and liable at any time to become a menace to the communities through which they pass.

Still another class which we have not understood is composed of those unfortunate persons who because of abnormal emotional trends or phobias are forced to commit acts over which they have no intellectual control—such persons as, entering a subway or crowded hall, are subject to seizure by an overwhelming sense of oppression and an irresistible desire to rush out into the open, which they frequently do.

Even without the direct proof now offered by medical science, it should be obvious to any thinking person that in all these cases there is something wrong in the delicate mental mechanism which controls the destinies of these people. And

there is just as much evidence that these mental disturbances are directly traceable to a physical cause.

Our present methods of handling criminals, not to mention our attitude toward all the classes of abnormalities mentioned heretofore, show an absolute lack of recognition of any connections between their acts and their mental and physical deformities.

The first thing to be understood about these people is the fact that the pathological criminal or mental defective is unable to adjust himself normally to his environment for the very important reason that the motivating activities of his brain are seriously disturbed.

To understand such disturbances, it is first necessary to know that the motivating activities of the brain are regulated entirely by two antecedent processes—the intellectual and the emotional, or affective, activities. If these two processes are well balanced, the motivating center will be stimulated in such a way as to make the individual adjust himself normally to his environment. Should this balance between the intellectual and the emotional processes be seriously disturbed, however, then it will be impossible for the individual to adjust himself normally and he will perpetrate acts which often are illegal and always abnormal.

The mind is thus a duality, and not a unity, and it must be understood as such if we are to gain a knowledge of its contents which will lead to a correct diagnosis of the conditions responsible for the maladjustment of individuals to their surroundings.

The intellectual side of the mind is that through which we receive perceptions and form conceptions. Our standards of judgment are born, and the actual processees of reasoning take place, in this department of the mind.

Perceptions are the elementary mental impressions received through what commonly are called the five senses. Conceptions are the pictures the mind registers and files away of the things perceived.

For instance, a child sees a radiator. That initial impression of color and shape is a percept, as is the impression of the sound the radiator makes. One perception goes into the brain through the projection centers of the visual nerves, the other through the projection centers of the auditory nerves. Together, the two percepts rush to the association centers of the brain and a concept of the radiator is formed.

The child, still moved only by the intellect, is curious concerning the radiator—wants to know more about it. He reaches out and touches the hot metal. Another percept reaches his brain at once, the percept of pain, traveling to the pain centers. This percept goes also to the association centers and makes more complete the concept of the radiator. It is a thing which has a certain appearance, makes a certain sound and produces a certain variety of pain. The visual percept and the sound percept of the radiator may not have awakened any wave of feeling in the child's brain of which he was conscious, but when the percept of pain was added to the mental picture of the radiator, then, aside from the actual pain impression, a wave of feeling which was distinctly one of displeasure was awakened in the child's mental make-up.

From that time on, reception into the child's intellect of any of the three percepts will rebuild the completed concept, which will cause the emotional side of his mind to experience again the emotion of fear. The radiator may be silent, but the mere sight of it reawakens the concept and the child will not touch it.

Something else may make a similar sound. Until developed reasoning power teaches him better, the child associates the sound with the hot radiator and will not touch the object which produced the concept-forming noise. If he should run against something hot in the dark, the child will think of the radiator, provided he has not been burned by something else. In each case, the reawakened concept would arouse in the emotional centers of the child's mind the emotion of fear and that emotion would make him avoid the real or fancied danger.

Through this simple illustration, we see the relation between the two departments of the mind and the functional activities of each department.

A disturbance in brain activity seriously involving either the intellectual or the emotional centers, or both of them, results in what is known as mental defectiveness. To understand these disturbances, it is necessary to examine the life processes of the cells of which the brain, like the rest of the body, is composed.

We know that the life processes of the brain cells consist of three kinds of activity—the nutritive, the formative, and the functional. Through the nutritive processes, the cells take in substances from the surrounding medium and store them as potential energy. The formative activity is the process of cell-division, or physical growth. The functional activity is the process whereby a cell, responding to a stimulus from without, performs some act—the contraction of muscle cells, the secretion of gland cells, the reaction of nerve cells, and so forth.

The potential energy stored by the nutritive activity is drawn upon constantly by the formative and the functional activities, the two being rivals. Before birth, the cells of the body are chiefly engaged in formative activity, while from birth on the functional activity rapidly increases until it becomes the predominating process in adult life.

So, if the chemical substances necessary for certain cells are not supplied sufficiently before birth, or in early life, the growth of the organ those cells compose is affected. This results in physical defectiveness, or in mental defectiveness if the brain is involved. The same lack of nourishment in later life will affect the cells' functional activity, or their power to act.

A division of mental defectiveness into three groups provides the best working basis for grasping the intricacies of the particular branch in which we are interested.

In order immediately to dispose of it, the Traumatic Type should compose the first group. This includes all those cases

in which the defectiveness is due to a definite physical injury to the brain before birth, at birth, or in early life.

Likewise, we should dispose of the Formative Type, or cases in which the brain in whole or in part has not developed because of improper cell growth.

The third, and to us the most important group because it is amenable to treatment, is the Functional Type. In cases of this type, the brain cells are not lacking in number, but there is a disturbance in the proportion of the different chemical factors in the surrounding medium from which the cells draw their necessary potential energy and activating substances, and therefore the cells do not react normally to stimulation.

The point at which an incoming impulse will explode the unstable protoplasm within the cell—thus turning the potential energy therein into kinetic energy—and release an outgoing impulse is called the threshold of functional activity. If there exists a normal chemical balance in the blood, and therefore in the cell, this threshold will be normal. If there exists a chemical unbalance or disturbance, then the threshold may be either raised or lowered.

Under conditions of chemical disturbance, this threshold may figuratively be compared to that of various grades of explosives. Gunpowder, for instance, is fairly stable, dynamite explodes more easily, and TNT has a still lower threshold.

It must be borne in mind that a normal threshold has a certain more or less constant level. If the threshold is raised above this level, the cell response is less active; indeed, the threshold may even be raised to the point where the cell will not respond at all to outside stimulation.

In a similar way, the lowering of the threshold below the normal level will bring about a condition in which the cell will respond to impulses that ordinarily would not cause a reaction.

One of the chief causes of a lowered threshold is a disturbance of the internal secretions. For example, a lowered threshold is found in persons in whom the thyroid substances of the body are increased. A marked instability of the cells is affected and explosive reactions will result from incoming im-

pulses which in normal circumstances would hardly produce any reaction. Likewise, when the thyroid substance is deficient, a person will not respond normally and keenly to an incoming impulse which in normal circumstances would cause a response, because the threshold of functional activity has been raised.

What is true of the thyroid is also true of the suprarenal, pituitary, and other gland secretions, though their action has not yet been as fully determined as that of the thyroid.

Interference with the functional activity of the cells and emotional instability may also result from the introduction of foreign toxins into the system. These toxins may not only affect the threshold of functional activity but may also create a disturbance of the internal secretory glands.

Both toxins and the chemicals in the blood act selectively upon the various centers of the nervous system. Ether, for example, selectively involves the highest centers of cerebration, raising the threshold to such a point that incoming impulses cause no reaction, thus producing unconsciousness; but at the same time it does not equally affect the nerve cells of the respiratory and circulatory centers, thus permitting those centers to respond to incoming impulses and allowing the person to live.

So we see that a chemical disturbance in the blood may affect the functional activity of one or more centers of the brain, making them either more unstable, or stable. This brings us to consideration of the effect of such disturbances upon our actions.

Perceptions and conceptions, formed in the intellectual side of the brain, send impulses to the emotional side. If these impulses pass the threshold of functional activity in the emotional centers, a wave of feeling, or emotion, results. If, through a chemical disturbance of the blood, the threshold of functional activity of the cell groups of the emotional centers has been selectively lowered, the wave of feeling may be so strong as to wipe out entirely all restraining influences coming from the intellectual side of the brain, and make the emotional the motivating impulse in the person's mental make-up.

In persons of normal emotional make-up unreasonable reactions may be prevented through inhibitions coming from the intellectual side of the brain. In persons of unstable emotional make-up, intellectual inhibitions may be felt, but if the wave of feeling is strong enough the person may not even be conscious of the inhibition. The wave of feeling simply wipes out the mental attributes of judgment, of right, and of thought of consequences and precipitates the impulsively inspired action.

The person so unfortunate as to be unstable emotionally is not only exposed to these impulses, such as anger impulses, sex impulses, etc., and to the consequences arising from them, but any succession of exposures is likely to build up phobias and trends which may make him lose complete intellectual control of himself whenever the impulse comes to him.

These pathological waves of feeling, aroused by a percept or a concept, may be either negative or positive. A negative wave, which would be a displeasurable one, may create in the brain an unreasoning fear of some object or condition which will impel him against all his intellect to some unreasonable or perhaps ludicrous action, though one usually not of a criminal type. A positive, or pleasurable wave, on the other hand, may create in the brain a trend which will impel a man upon re-experiencing the concept to an action which is unreasonable and often criminal.

The boy in a comfortable home may be inflicted through unstable emotional make-up with a trend for running away and undergoing all sorts of unnecessary hardships; the boy who has all his desires gratified may be inflicted with a trend to steal and eventually becomes a forger and thief; men of good training and intellect may come to commit heinous crimes; girls of good family and training may be led to the streets, and our reformatories, jails, and corrective institutions become constantly more crowded with persons who never should have been sent to them either in justice to themselves or to the rest of the community.

It should be emphasized that persons impelled by overpowering impulses that are not criminal have nothing to gain

by their unusual actions; instead, they more often have much to lose by resulting ludicrous situations. Even those impelled to steal may in the next moment give away what they have taken. It is not as though they act for their personal benefit—they simply cannot help it.

Instances, no two alike, could be cited indefinitely, and the encouraging part of it is that most of these people can be relieved if not cured.

It is apparent that, if through tests we can find a chemical disturbance in the blood of persons of obvious unstable emotional make-up, we can lay hands on the seat of the disturbance in most cases and help them. In many of the cases examined at the Post-Graduate Hospital, chemical disturbance was found, and in more than half of these cases the cause was traced directly to certain of the internal secretory glands.

This has been accomplished through only a few blood tests which have been evolved. New tests are being worked on constantly, and the hope is to narrow the field until we can lay a finger on the seat of all emotional disturbances.

The large number of cases examined have given sufficient data to show a connection between emotional types and a disturbing of definite glands, and the attempt now is to establish a definite cause for each criminal type.

Necessarily the treatment varies in every case. It consists in most cases in raising the threshold of functional activity by chemical substances which prevent excessive stimulation of the internal secretory glands and by neutralizing the effects of certain excessive secretions by introducing counterbalancing substances.

The principles of the counterbalancing substances are found in animal glands, but these for the most part also remain to be determined with any degree of precision.

Where the disturbance is of thyroid origin, methods have been fairly well worked out, and there has been some success with suprarenal unbalances, but the pituitary and other glands have not yet revealed their secrets.

Based on the rapid strides made since this particular study was begun in 1912, there seems to be no limit to the possibilities which the research of the next few years may open. The key may safely be said to have been found and the lock turned; it remains to discover what lies beyond in definite methods of diagnosis and treatment.

Means for this research, so vital for the protection and welfare of every home, are not now at hand. Such institutions as we have were designed and established for the most part only for segregation or punishment. There is no provision for the necessary constant observation and treatment.

It is foolish to build institutions for detaining defectives for long periods as a punishment for a condition for which they are not responsible, and then discharge them without doing anything to remove the cause of their trouble. Every person handled in this manner is not only an expense to the State, but he is made a potential menace to the State. His emotional instability lays him wide open to all sorts of concepts and impulses from intellectual criminals.

The attitude of the public and of the State toward the social problem must be changed if conditions are to be improved. Hospitals must be substituted for prisons and treatment for punishment, so far as defectives are concerned. (Schlapp.)

CHAPTER XV

NEUROSES AND PSYCHOSES

All changes, from mild depression or exaltation to melancholia and dementia, may be seen in dysthyroidism, but the milder forms resembling "neurasthenia" are the most frequent; disorders of sleep, up to severe insomnia, are present in almost half of the cases of hyperthyroidism.

Neurotic symptoms are often suggestive of myxedema and curable by thyroid. In myxedema, patients are depressed almost to the verge of melancholy without the self-accusation and despair of true melancholia. They are sluggish in their thought, unable to remember recent events, indifferent to their surroundings, without interest in personal and family affairs. They take an unfavorable view of their own condition, their will power is impaired. There is a mental inertia, they are inclined to be sleepy, and often sleep heavily both day and night and awake without any sense of refreshment (Starr).

Physically there is a dryness of the skin and hair; the skin does not perspire, it becomes pigmented; the hair falls out or becomes gray. The surface of the body is cold, the hands and feet are always cold. Appetite and digestion are impaired. There is an interference with the calcium metabolism. There is a progressive gain in weight. There may be constant pain in the muscles and bones. Levi, of Paris, says that in many cases of chronic rheumatism thyroid treatment is the best. When nervous or "neurasthenic" patients complain of such symptoms, one grain of thyroid twice a day, added to the other treatment, is of value. In ten days the effect should be evident in less dryness of the skin, in relief from the sensation of cold, and in the decided improvement in mental activity.

Mental sluggishness in young girls, with symptoms resembling dementia præcox, and considered as cases of weak-mindedness, may obtain mental activity by taking thyroid. The symptoms are not enough to warrant the diagnosis of myxe-

dema, but the dry, scaly skin, dryness of the hair, and coldness of the body suggests the use of thyroid extract. (Starr.)

Neurotic Symptoms of Hyperthyroidism.—There is nervous excitability, very active mentality, tremor, muscular irritability, and quickness of thought. Excessive function of the thyroid, not sufficient to produce exophthalmos or goiter, or a very rapid pulse, may produce symptoms of a nervous character simulating "neurasthenia."

Certain people are restless and cannot keep quiet, find it impossible to lie down or rest, are unable to keep their minds on any one subject for any length of time. They realize that the train of thought is unusual, and they fear insanity. They have a sense of heat in the body, a desire for cool air and fresh air, a burning sensation, which leads them to sleep with light bed-clothing, and very frequently leads to perspiration; the desire for cool air prevents them from going to the theatre or church or remaining in hot rooms.

The skin is shiny and moist, the hair is moist and glossy, and the patients are usually thin. There is tremor about the hands and exaggerated knee-jerks, patients are subject to diarrhea, menstruation is altered, they sleep badly, complain of sudden flashes of heat, pulse between 80 and 90.

When these conditions are present in a case of "neurasthenia" the thyroid gland is probably over-acting (Starr).

Hypopituitarism—"Drowsiness, torpidity, occurs with *hypopituitarism*. Many of the patients show an inclination to dose throughout the twenty-four hours; in others, the somnolent period occurs in more or less definite cycles, with intervening days of normal response. Glandular therapy improves the mental activity and lessens the drowsiness. *Sleeplessness* would be expected to accompany hypersecretion, but this is rarely noted" (Cushing). I find sleeplessness and headaches generally associated with overactivity of the posterior lobe. I find overactivity of the posterior lobe, if associated with thyroid minus, the most frequent cause of high blood-pressure (Bandler).

Anesthesia, or insensitiveness to pain, and obstipation are

associated with hypopituitarism. Psychic disturbances—some are due to excess or perversion of secretion, others to insufficiency.

With *hypopituitarism* there are gradations of disturbance from mild psychoses to extreme mental derangement. There is inability to *concentrate;* there is impairment of memory. Former powers of mental activity may be restored with the readjustment of a physiologic balance through glandular administration. In most cases of hypopituitarism sufficient to cause adiposity, deviations from the normal intellectual level may be expected. There may also be drowsiness. Psychic disturbances of varying degree are common." (Cushing.)

Dercum's disease includes psychic derangement.

Many patients with hypopituitarism have shown epileptiform tendencies.

"As the posterior lobe secretion normally enters the cerebrospinal fluid, and thus comes in contact with the solution which bathes the cortex, it is possible that its diminution in hypophyseal disease may unfavorably affect the activity of the cortical cells." (Cushing.)

There are mental changes, such as lack of ambition, indifference to matters of importance, inability to do ordinary work, and a state of mind such as seen with chronic opium habit. The extreme forms are easily recognized. In so-called "neurasthenics" many minor conditions are probably due to disturbances of this gland. There is also a type of neurasthenic who is fat, gaining in weight, has a lack of ambition, craving for sweets, and in all probability some of the nervous manifestations are due to the hypophysis. In two or three such cases of marked headache, the use of pituitary extract has caused relief and has improved many of the nervous symptoms. These cases may also be improved by thyroid extract, which acts very much like hypophysis. Starr gives one or two grains a day for ten days, then an intermission of five days, and then again.

Hyperpituitarism—"With hyperpituitarism *temperamental* changes are often apparent with *wakefulness,* lack of *concentration,* indecisiveness, *irritability,* distrust, in other

words, *psychasthenic states,* which are not unlike those with which we are familiar, in moderate degrees of dysthyroidism. When hyperpituitarism dates from early life, the individual is usually deficient in educational training from the outset. (Cushing.)

Neuroses Connected with Ovarian Atrophy.—Mental irritability is the most distressing symptom; the sense of apprehension, inability to control the temper, restlessness, states of depression, defects of judgment and memory, lack of self-control, are frequent symptoms; intense headache, pain in the *back of the head and neck,* sudden flushes, sensations of pressure in the head, irregular digestion, irritability of the bladder, pains in the muscles. The majority of these symptoms are due to overactivity of the posterior pituitary which overactivity occurs then after cessation of ovarian function.

These symptoms seem to be periodically increased after menopause, at a time coincident with what should be the normal period, but are more or less present for two or more years after suppression of the function of the ovaries. Many of the symptoms appearing at the menopause are suggestive of the hypersecretion of the thyroid, as they are similar to symptoms occurring in Basedow's disease, but they are not wholly hypersecretion of the thyroid. Most of the symptoms are due to overactivity of the adrenal medulla and especially of the posterior pituitary. Corpus luteum makes the hyperthyroid cases worse. It may help the hyperpituitary cases. Placental extract helps the latter, often quite specifically.

The relation of thyroid and ovaries is shown by the swelling of the thyroid during the first weeks of married life. When the ovaries cease to perform their functions, they may be (1) a hypersecretion of the thyroid leading to the sense of deep flushes, rapid pulse, and mental irritability; or there may be (2) cessation of the thyroid, leading to an accumulation of fat, a sluggish state of metabolism, and depression and partial dementia; the first form is treated by the use of ovarian extract, ovarian residue, suprarenal extract, adrenal cortex for weeks, the latter by the use of thyroid for a long period.

CHAPTER XVI

PHOBIAS

Nothing can contribute more to the valuable study of human nature, to a proper understanding of psychology, and to an explanation of mental states and psychoses than adequate proof of the fact that the instincts and the emotions have a neuro physical basis, and are not produced solely and entirely by cerebral activity. If the instincts of flight, pugnacity, gregariousness, repulsion, suggestibility, contra-suggestion, etc., are each in their turn an evidence of and the result of definite and specific endocrine activity, much that seems wonderful will be simple.

I might begin now with the question, "Why is it that a red rag irritates a bull?" The retina in its pigmentation, and because of its pigment, must be in close association with the suprarenals. Referring now to the adrenal connection, there are certain retinal cells and fibres which are connected through the autonomic system with the adrenal medulla; there are certain cells connected through the same system with the adrenal cortex, and, therefore, as the retina in different animals, races and in different individuals differs in its structure and sensitiveness, so in the bull the connection with the adrenals, especially the cortex, is such that red, as a color, immediately stimulates and rouses it and associated glands with the resulting production of the instinct of pugnacity and the emotion of anger.

The possibilities of such interpretation lead us to readily understand why black and darkness depress and frighten, since the connection with and influence on the adrenal medulla is a neuro physical one.

The negro race with its fondness for bright colors illustrates the physical basis just mentioned. As the skin pigment calls our attention to such a possibility, it can be readily appreciated that the retinal composition and sensitiveness differs from that of the white races, and for that reason the retina is

extremely sensitive to bright colors. It is not enough to say that this race, because of its lack of education and training, is, for that reason only, naturally sensitive to certain bright pigments. The negro race is very subject to fibroids or fibromyomata. This points to excessive activity in them of the posterior pituitary lobe since this gland with or without the aid of the anterior pituitary is responsible for these uterine tumors. This excessive action of the posterior pituitary in the negro race plus the adrenal makeup would readily account for their emotional character, etc. If to this be added a gonadal relationship different from that in white people, the genital differences are to be readily understood.

The same difference in sensitiveness and attraction holds true with the impressions made through the ear and the sense of hearing, and likewise holds true of the other senses. So the music of the negro differs from that of the whites, and so the music of various races shows equally great differences. Music, characteristic of the different races, has therefore not only a psychic but a physical basis for its character and type since both physical and psychic states are due to endocrines.

And so races differ primarily in color, facial character, body form, mental attitude, suggestibility, pugnacity, education, tastes, customs, wisdom, energy, etc., along the lines of endocrine co-relation and inter-relation, and numerous differences in skin pigment, in instincts, emotions, mental ability, pugnacity, fear, gregarious instinct and other instincts, emotions and characteristics are to be found among the individuals of each race. There is not an instinct or an emotion, whatever divisions or classifications a psychologist may make, that cannot be readily accounted for on an endocrine basis, and psychoses are simply exaggerations of an abnormal character of any one, two or more of the simple and ordinary instincts and emotions with which the human being and especially the physician has to deal.

People who are off the normal line as to music (ear), as to colors (eye), and to combination of colors (as in certain schools), are very apt to be off the normal in their instincts

and emotions since the physical basis for the one as it runs back to the endocrines presupposes a different endocrine relation at the bottom of the instincts and emotions. This off from the normal as to tastes, dependent on any of the senses, presupposes a like deviation in instincts, emotions and psychic reaction and behavior.

Life is a struggle in many ways. An important contest is that between the endocrines, which are the main factors conferring immunity, on the one hand, and bacterial infections and physiological processes on the other. So results the survival of the fittest. In addition to bacteria the storm, the stress and the accidents of environment and of life are playing an all important part.

I wish to attract attention to the thyroid gland, to the adrenals, to the pituitary, and to that structure in the ovary known as the corpus luteum. For it is the thyroid, the adrenals and the posterior pituitary which are the end organs most closely related to fears, anxieties and phobias. But in the absence of infections, the little devil physically responsible as a primary factor is the corpus luteum, responsible in the sense that it makes women and the female more liable to fears. I have advisedly said physically responsible and I now come to the question of psychic responsibility.

Impressions made during the early years of childhood are the most lasting as concerns the instincts and the emotions even though not remembered. Stimuli through any of the senses without consciousness but especially when associated with consciousness follow definite neuro endocrine paths and result in emotions and the typical behavior associated with these emotions. Of all the elements through life which produce injurious effects and lasting harm, fear stands at the head.

Some children are not easily frightened; others are more readily frightened, and still others are of an extremely fearful or fearsome nature, and to call these neurotic or psychopathic, and to say that they have inherited these conditions may be only too true, but it explains nothing which the parents can

understand, and hope to correct, nor do these terms imply in the least that the physician recognizes that there is something wrong which may be corrected. Parents must and should do everything with children to avoid inculcating fear, and should remove any element of fear as much as possible from the mind and consciousness of the child. At a later age fears, though not remembered as having been experienced earlier, may and do persist as sensitive paths and so continue throughout the whole life of the affected individual.

Little Red Riding Hood, Grimm's Fairy Tales and stories relating to death, to fearsome things, etc., should be entirely abolished from the life of the child. Threats, punishments, etc., which rouse fear are a most criminal part of the so-called disciplinary methods introduced into the life of the child. Some children are not readily frightened, others very easily. What do we know of the dreams of the child, filled often enough with fear and terror, thus reproducing, during what should be restful sleep, the ofttime terrible and horrible imprints made upon the mind and psyche.

In physical fear, the adrenals are the endocrines especially associated with this emotion. The less is the response of the adrenal cortex, and the more sensitive is the adrenal medulla, the more likely is the child to experience fear. The more active is the thyroid and the more sensitive its reaction, the more it enhances the tendency to the emotion of fear and the instinct of flight. When a child wakes in fear or terror, or without this evidence wants to go into the bed of its mother or its nurse, that child is anxious and frightened. When a child, on retiring, makes excuses to call its mother or nurse to the bedside, wants a light in the room, or a light in the hall, that child is frightened. When I realize how little understanding there is of this fact among parents and physicians, I, in my turn, shudder at the injustice done to myriads of children by the different disciplinary methods of "Teaching that child to behave."

I marvel at our slow pace in recognizing the importance of all the endocrines from the day of birth on. We know how

necessary the anterior pituitary and the thyroid are to mental and physical development. We are beginning to realize the value of the adrenal cortex; we are beginning to realize that the thyroid has two totally distinct secretory structures, but where do we stand on the question of the ovary? The interstitial ovary and the glandular are functionating all the time and are most important to the physical, mental and psychic welfare of the child and of the adult. If attention were paid to what I am now saying, we would find in thousands of little girls a cyclic premenstrual wave noticed in the sphere of behavior and psychic reactions where now no attention is paid to such a possibility since little girls do not menstruate. But even when they do begin to menstruate, and at the stage of puberty do evidence symptoms pointing to hyperthyroidism and other symptoms resembling these, but due to hyperactivity of the adrenal medulla, even then very little attention is paid to the premenstrual constitutional and psychic phenomena.

The two secretions of the ovary and the two secretions of the thyroid stimulate each other but are at the same time antagonistic. This relation of stimulation or production of normal balance between any two glands or between the two parts of each gland is essential to the normal action of those glands or parts of each gland on the body, visceral functions and psyche of any individual. For perfect health there must be a normal balance between the anterior and posterior pituitary, between the interstitial and glandular portion of the thyroid, between the adrenal cortex and the adrenal medulla, between the interstitial ovary and the glandular ovary, between the interstitial and glandular pancreas, between the interstitial and glandular kidney, etc. For perfect health there must be a normal balance between these glands and the parathyroid and the thymus and the pancreas, and pineal, etc. In my experience the importance of the parathyroids has been grossly underestimated, and this gland and the pineal are receiving from me, as the other glands have long received from me, more and more attention from the therapeutic standpoint.

But the little devil in this chain is the corpus luteum of the glandular ovary. The only secretions which the female has, which the male has not, are the corpus lutem, the mammary and the placenta. This latter gland extract has been used therapeutically by me in several hundred cases so that I now can affirm that it is one of the most important additions to our therapy, and it seems to be an antagonist able to put many of the endocrines, especially the posterior pituitary, to sleep. But thyroid diseases and overactivity of the adrenal medulla are peculiar to women, and we know the thyroid diseases are ten times as frequent in women as in men. Thyroid affections, especially hyperthyroidism, vary in severity and symptoms according to the degree to which other glands, especially the adrenals, are involved. Thyroid diseases vary likewise according to the degree to which the interstitial or the gland element of the thyroid are involved. One reason why women are so liable to thyroid affections is that they produce and retain within their ovaries persistent corpora lutea. For years I have lectured, and proven by therapy, that the corpus luteum is a totally different secretion from that of the ovary itself, and that the indications for its administration are directly the opposite of that for administration of ovarian extract and of ovarian residue. Hence, my therapeutic results of the last twenty years can be readily explained.

In 1906 I published in the *American Journal of Obstetrics* an article entitled "Associated Nervous Conditions in Gynecology with Especial Reference to the Climacterium and Allied States." There were reported twenty-eight cases of hyperthyroidism. These were made worse by thyroid extract administered to verify diagnosis. The important point was that ovarian extract whole gland was the specific therapy. In several publications I pointed out that persistent corpora lutea inhibited ovulation and were the responsible factors in many cases of sterility; that many of these cases were cured by the administration of ovarian extract with small doses of thyroid and other extracts, while others conceived only after surgical removal of the retained cysts and corpora lutea.

I have prescribed corpus luteum once in comparison with ovarian extract with or without ovarian residue fifty times, and now many who have prescribed corpus luteum extract as a routine are at last seeing the light.

The glandular ovary and the corpus luteum, as stated above, is the only secretion which can by any possibility be made specifically the primary responsible factor for the greater tendency to hyperthyroidism in women. Since we know that ovarian extract and ovarian residue are antagonistic to the corpus luteum, and since overactivity of the adrenal medulla is often an accompaniment of hyperthyroidism, we may the more readily understand why ovarian extract and suprarenal extract, which contains the cortex, are of such undoubted value in certain forms of hyperthyroidism. Since overactivity of the posterior pituitary is likewise present, especially in the exophthalmic cases, the value of placental extract may likewise be recognized.

So far as adrenalin is concerned, I long ago discontinued its use in the emergency complications occasionally seen in post-operative cases, feeling that it often did harm and not good, and just as soon as an extract of the adrenal cortex, which at present is found in suprarenal extract, is in our hands, we will then have one of the several new extracts which will save life and tide patients over the critical periods in the infectious diseases, and in post-operative complications. The anxious facies which is noted in pneumonia, in infectious diseases and in peritonitis has a meaning of great significance. It points distinctly to the adrenals.

Let me say that an actual or relative inadequancy of the adrenals or of the adrenal cortex may be congenital or acquired. It may result through the infectious diseases of childhood, particularly through influenza; it may be caused by pregnancy and labor, very frequently by lactation, etc., but I believe that psychic experiences, mental shocks, etc., are just as able to injure a sensitive endocrine or part of an endocrine or to stimulate an endocrine, or part of an endocrine, as are the infectious diseases or normal processes. On the other hand in-

fluenza or any infectious disease, or a physiological function or a physiological process may arouse or stimulate a gland or glands or part of a gland to increased activity, so that even after an influenza or an infectious disease and certainly after pregnancy some patients are in better health than before.

It must be remembered that the addition of other extracts has a powerful influence in aiding the correction of the states of terror, fear and anxiety. (Testicular extract, ant. pit., etc).

The pituitary gland is closely related to fears, phobias, states of anxiety, suspicion, etc. A lack of balance between the anterior and posterior lobes with the associated lack of stimulation or overstimulation of the brain cells is an important factor. The posterior pituitary is associated with control over kidney function. If underactive, urinary excretion may be increased (diabetes insipidus). If overactive, urinary excretion may be diminished or on the other hand increased. There are with posterior pituitary changes the same types of interference with osmosis in the cerebro-spinal fluid. Overactivity of the posterior pituitary is thus responsible for hypertension of the cerebro-spinal fluid, especially with thyroid minus, but not with thyroid minus only. Then come the typical occipital headaches running behind the ears, down the neck, spine and legs, to be viewed as an evidence of posterior pituitary plus with increased pressure in the cerebro-spinal canal. This state is observed especially in the preeclamptic and eclamptic patients. This posterior pituitary involvement occurs in association with kidney lesions after infections, especially influenza. The kidney epithelium is the more vulnerable, the more the thyroid is injured and its secretory activity is diminished. Even with thyroid plus, the posterior pituitary is often overactive and then the high blood pressure in the general circulation is not noted. My observations and therapy show that posterior pituitary plus is a frequent accompaniment of the severe forms of hyperthyroidism, of exophthalmos, and of exophthalmic goitre. Posterior pituitary is a frequent cause of anxieties, fears, phobias, suspicions, etc. It is not always easy to determine whether it is overacting or underacting,

for the associated activities of the thyroid, adrenal medulla, adrenal cortex, etc., have to be taken into consideration. Placental extract and thyroid antagonize the posterior pituitary. The thyroid is the great regulator of posterior pituitary activity. Placental extact likewise by its action on this lobe and by the effect it has on the osmosis in the cerebro-spinal canal is a therapeutic agent of the greatest value. Pituitary is responsible for psychic fears as distinguished from physical fear, if such a distinction can be made.

CHAPTER XVII

The investigations of Eppinger and Hess concerning the vegetative nervous system whereby the latter was divided, broadly speaking, into the Sympathetic on the one hand, and the Vagus on the other, attracted attention to the importance of this system.

The Sympathetic was said to dilate the pupil, protrude the eye, accelerate the heart, inhibit peristalsis, relax the spincters, cause glycosuria and polyuria, etc.

The Vagus was said to contract the pupil, slow the heart, increase peristalsis, stimulate the gastric juice, etc.

Adrenalin stimulates the Sympathetic; *Pilocarpine* stimulates the Vagus; *Atropin* paralyzes the Vagus.

Vagotonia, relative or actual predominance of the Vagus system, was said, among other things, to be responsible for asthma, bradycardia, angina pectoris, etc.

The Suprarenal Cortex is probably a stimulator of the Vagus.

Sympaticotonia was said to be responsible for dermographism, embarrassment, hyperidrosis, diarrhea, tachycardia, congestion of the head, etc.

In sleep, the Sympathetic is supposed to be at rest, hence the relative predominance of the Vagus with the narrow pupils, slow pulse, perspiration, etc. For that reason, asthma, colic and labor pains develop so often when the Sympathetic is at rest.

Pigmentations were credited to the Vagus Nervous System and are observed in Addison's Disease and Graves' Disease. Likewise patches of gray hair on one side associated with migraine and hemicrania.

Anaphylaxis was credited to Vagus stimulation and is observed often in the young in the form of asthma, laryngeal spasm, status lymphaticus, etc.

The vegetative nervous system is a system which possesses ganglia and the structures it innervates are not subject to voluntary control. There are centers in the fourth ventricle, in the subthalamic region, in the mesencephalon, passing to the chromaffin system, to the thyroid and probably to other endocrines. This system and its associated endocrines are readily influenced by psychic factors. Though formerly the system has been broadly divided into the Vagus and the Sympathetic, the following arrangement is anatomically more accurate.

Cannon in his wonderful work on the adrenals and adrenal extract gives what is perhaps the best and most scientific resumé of this system, as follows:

The vegetative nervous system is better spoken of as the "autonomic," which name is perhaps the wiser one to use.

Autonomic nervous system (Langley) indicates that the structures which this system supplies are not subject to voluntary control. These structures are readily influenced by pain and emotional excitement.

There are three divisions: (1) cranial; (2) thoracico-lumbar; (3) sacral. The second, or thoracico-lumbar, is the sympathetic system.

The neurone relations in the sympathetic division seem devised for widespread diffusion of nervous impulses.

The fibres of the "sympathetic" are widely distributed throughout the body. They

(1) Dilate the pupils.

(2) Stimulate the heart,—cause it to beat rapidly when stimulated.

(3) Carry impulses to arteries and arterioles of skin, abdominal viscera, keeping the smooth muscle of vessel walls in state of slight contraction or tone, preserving or raising (in times of special discharge of impulses) the arterial pressure.

(4) Distributed to smooth muscle attached to the hairs, and when they cause this muscle to contract the hairs are erected.

(5) They go to the sweat glands, causing an outpour of sweat.

(6) They pass to the entire length of the gastro-intestinal canal. In pain and emotional states digestive activitity is inhibited by impulses carried by the splanchnic branches of this system.

(7) They innervate the genito-urinary tract, causing contraction of the smooth muscle of the internal genital organs, and, usually, relaxation of the bladder.

(8) They effect the liver, releasing the storage of material therein in time of need.

Pain, fear, and rage, and intense excitement, are manifested in the activities of the sympathetic division. When in these states impulses rush out over the neurones of this division, they produce all the changes typical of sympathetic excitation, such as dilating the pupils, inhibiting digestion, causing pallor, accelerating the heart. Sympathetic fibres, normally, deliver impulses which cause contraction of the internal genitals and relaxation of the stomach and intestines. (Cannon.)

The *cranial and sacral* divisions of the autonomic system have a restricted distribution. The cranial and sacral preganglionic fibres resemble the nerves to skeletal muscles, and their arrangement provides similar possibilities of specific and separate action in any part without action in other parts.

The cranial autonomic, represented by the vagus nerves is concerned in the psychic secretion of gastric juice. The cranial nerves passing to the salivary glands are the agents for psychic secretion in these organs and cause dilatation of arteries supplying these glands.

Cranial autonomic fibres contract the pupil of the eye.

Cranial autonomic fibres slow the heart rate. The third cranial nerves deliver impulses to ganglia, containing neurones innervating smooth muscle in the front of the eye. The vagi, when stimulated, increase the tone in the smooth muscles of the alimentary canal. The vagus nerves are distributed to the lungs, the heart, the stomach, the small intestines. The out-

lying neurones in the last three of these organs lie within the organs themselves. The vagus nerve, when artificially stimulated, has a primary brief inhibitory effect on the stomach and small intestine. Its main function is to produce increased tone and contraction in these organs. Thus the vagus has here a double action. (Cannon.)

The cranial and sacral divisions supply individual arteries with "dilator nerves." The cranial and sacral divisions have few of the diffuse connections of the mid-division or sympathetic.

The vagi, when stimulated, increase the tone in the smooth muscles of the alimentary canal.

The *sacral* autonomic fibres pass out to ganglia lying in close proximity to the distal colon, the bladder, and the external genitalia.

Fibres of the sacral division include fibres which

(1) Contract the rectum.

(2) Contract the distal colon.

(3) Contract the bladder. These effects result reflexly from stretching of the tonically contracted viscera by their accumulating contents.

(4) The nervi erigentes which bring about engorgement of erectile tissues in the external genitalia.

The sacral nerves of the autonomic have no effect on the internal genitalia (Langley).

"Distension is the commonest occasion for bringing the sacral division into activity. Great emotion accompanied by nervous discharges, by way of the sympathetic, may also be accompanied by discharges by way of the sacral fibres. Hence, involuntary voiding of the bladder and gut at times of violent mental stress. The power of sights, smells, and libidinous thoughts to disturb the regions controlled by the nervi erigentes proves that this part of the autonomic system also has its peculiar affective states. The fact that one part of the sacral division, that is, the distribution of the bladder, may be in abeyance while another part, the distribution to the rectum is active, illustrates again the directive discharge of impulses

which are characteristic of the cranial and sacral portions of the autonomic system. The cranial division and the sacral division are engaged in the performance of acts leading immediately to greater comfort." (Cannon.)

Many of the viscera are innervated both by the cranial or sacral part of the autonomic and by the sympathetic.

Because antagonisms exist between the sympathetic and the cranial and sacral divisions, affective states may be classified according to their expression in the middle, or cranial, or sacral divisions, and these states would be, like the nerves, antagonistic in character.

When the sympathetic meets either the cranial or the sacral in any viscus, their effects are antagonistic. The cranial contracts the pupil; the sympathetic dilates it.

The cranial slows the heart; the sympathetic accelerates it.

The sacral contracts the lower part of the large intestines; the sympathetic relaxes it.

The sacral relaxes the exit from the bladder; the sympathetic contracts it.

It is highly probable that the sympathetic (because arranged for diffuse discharge) is likely to be brought into activity as a whole, whereas the sacral and cranial divisions, arranged for particular action on separate organs, may operate in parts. The impulses of the sympathetic neurones, as indicated by their dominance over the digestive process, are capable of readily overwhelming the conditions established by neurones of the cranial division of the autonomic." (Cannon.)

Antagonism between emotions expressed in the sympathetic and in the cranial division of the autonomic system is evidenced as follows: Among the functions of the cranial autonomic are the relatively mild pleasures of sight, and taste, and smell of food. These are abolished instantly in the presence of emotions which activate the sympathetic. The secretion of saliva, gastric juice, pancreatic juice and bile is stopped, and the motions of the stomach and intestines cease at once

whenever pain, fear, rage, or other strong excitement is present in the organism. (Cannon.)

Antagonism between emotions expressed in the sympathetic and in the sacral divisions of the autonomic system are illustrated as follows: The nervi erigentes are the parts of the sacral autonomic in which the peculiar excitement of sex are expressed. These nerves are opposed by branches from the sympathetic division, the division which is operated characteristically in the major emotions. Prince states, "The suppression of the sexual instinct by conflict is one of the most notorious experiences of this kind in every day life. This instinct cannot be excited during an attack of fear or anger, and even during moments of its excitation if there is an invasion of another strong emotion the sexual instinct is at once repressed."

The vasa deferentia and the seminal vesicles, whose rhythmic contractions mark the acme of sexual excitement in the male, and the uterus, whose contractions in the female are probably analogous, are supplied by the lumbar branches of the sympathetic. These branches act in opposition to the nervi erigentes and cause contraction of the vessels to the external genitalia. The sexual orgasm involves a high degree of emotional excitement, but it can be rightly considered as essentially a reflex mechanism; and, again in this instance, distension of tubules, vesicles and blood vessels can be found at the beginning of the incident and relief from this distension in the end.

When the acme of excitement is approaching it is probable that the sympathetic division is also called into activity; indeed the completion of the process, the contractions of the seminal vesicles and the prostate and the subsidence of engorged tissues, all innervated by sympathetic filaments, may be due to the overwhelming of sacral by sympathetic nervous discharges. As soon as this stage is reached, the original feeling has likewise been dissipated.

"The other parts of the sacral division which supply the bladder and rectum are so nearly free from any emotional

tone in their normal reflex functioning that it is unnecessary to consider them further with reference to emotional antagonisms. Mild affective states, such as worry and anxiety, can, to be sure, check the activity of the colon and thus cause constipation. But the augmented activity of these parts (contraction of the bladder and rectum) in very intense periods of emotional stress, when the sympathetic division is strongly innervated, presents a problem of some difficulty. Possibly in such conditions the orderliness of the central arrangements is upset, just as it is after tetanus toxin or strychine poisoning, and opposed innervations no longer discharge reciprocally, but simultaneously, and then the stronger member of the pair prevails. Only on such a basis at present can I offer any explanation for the activity and the supremacy of the sacral innervation of the bladder and distal colon, when the sympathetic innervation is aroused, as, for example, in great fright." (Cannon.)

CHAPTER XVIII

THE BALANCE BETWEEN THE ENDOCRINES AND IN EACH INDIVIDUAL ENDOCRINE

The cerebrum is affected by stimuli through the senses (sight, hearing, smell, taste, touch, pain and temperature, etc.). The autonomic nervous system has its intimate and close relation with the cerebrum. Stimuli through any of these senses cause reaction, instinctive action, unconscious and conscious action. Volition, thought, etc., are functions of the psyche and the mind. As a result of certain stimuli, particularly and definitely such as are associated with the instincts and playing their part in arousing emotions, there is response on the part of the autonomic nervous system, on the part of the visceral organs and structures with which they are connected, and a response on the part of the associated endocrines. The autonomic nervous system, in its relation to the endocrines, is responsible for and responds to the instincts and emotions. The autonomic nervous system may be divided broadly into the vagus and the sympathetic which produce opposite or opposing actions in the structures, organs, and endocrine glands which both innervate and supply. A relation between the two divisions of the autonomic system exists and is supposed to preserve that equilibrium and normal balance essential to normal action and normal response in the functions of the organs which they supply. An excessive control above the normal balance on the part of one or the other, or variations in their normal balance differing from the normal, are productive of abnormal action. In many conditions the blame may be laid on overactivity or underactivity of one or other of these branches of the autonomic nervous system and hence in the same disease there are minor variations from the typical or supposedly pathognomonic signs.

A study of the innervations and resulting normal functions regulated by the autonomic nervous system and the diag-

nosis of altered or abnormal function of any of the structures so innervated constitutes a very difficult problem and from the standpoint of therapy leads us nowhere, since the real cause is thereby neither divulged nor attacked. Our real field lies in studying the endocrines themselves.

The endocrines likewise respond to impulses sent to them through the autonomic nervous system, and the endocrines respond according to the strength of the impulse, but more particularly according to their own development, capacity, vigor, and the balance existing between the component parts of each endocrine gland. The endocrines may be underactive, normal, or overactive. They may increase or diminish in power and in secretory activity in varying degrees through the different periods of life, in the performance of physiological functions, and during disease and infections.

The important point first to be held in mind is the normal, stable balance or interrelation between the various endocrines of the body. Of equally great importance is the preservation of balance between the various hormones produced by any one gland. In the pituitary the two most prominent secreting areas are the anterior lobe and the posterior lobe. In the adrenals we have the cortex and medulla totally different in structure and character, as well as in the influence and the action of their respective secretions. In the ovary we have the interstitial or interglandular structure and the follicular part of this gland. When ovulation takes place in association with menstruation, and probably long before this, we have the false corpus luteum. When pregnancy takes place we have the true corpus luteum. It is the corpus luteum which is responsible for hyperthyroidism. In the thyroid we certainly have two different secretions, one from the interstitial portion and a different one from the glandular, and this accounts for the various types of hyperthyroidism and of Basedow's disease aside from the fact that the severe forms of hyperthyroidism are pluriglandular upsets. In the pituitary there is a certain normal balance of relation between the anterior and posterior lobes. In the adrenals there exists what may be determined to be or be called a normal bal-

ance between the cortex and the medulla and the same is to be said of the interstitial and glandular portions of the ovary. It must be stated here that the ovary functionates long before menstruation is established, probably from the earliest years, just as do the other endocrines, and that a so-called menstrual wave in the vast number of cases is not looked for, noticed, or observed. It is, as a rule, not evidenced by any type of reaction. But in many cases, if looked for, there will be noted regular monthly evidences of this internal process and in these cases it is productive of the same type of premenstrual nerve and psychic phenomena as is recognized in older girls before each monthly outpouring of blood from the uterus. Only when the corpus luteum enters into the field do hyperthyroidism and Basedow's disease appear as a rule.

Any endocrine composed of two recognized and distinct parts may overact in both or underact in both. Overactivity may involve one part and the other may functionate normally. One part may overact and the other underact. The important point is that to whatever degree one part overacts to the same degree may it *overtop and inhibit* the action of the other, and this difference may not be made visible by corresponding anatomical differences in size in the respective parts of the glands. Overactivity of the anterior pituitary often diminishes the secretory activity and action of the posterior, though in the early stages the posterior may have been likewise correspondingly active; and this is well exemplified in acromegaly with its early glycosuria.

Overactivity of the interstitial ovary may be associated with varying degrees of inhibition of function of the glandular part. The reverse also holds true. But persistent corpora lutea inhibit ovulation, inhibit the normal action of ovarian secretion and rouse the thyroid. Overactivity of the adrenal medulla is generally associated with underactivity of the cortex. And here as in all glandular organs we have what might be called two secretions antagonistic to each other.

What a vast meaning does this bear to the question of therapy. Taking these factors into consideration, we see how

the balance in any one gland may be disturbed and how we may have numerous combinations of over and underactivity in the interrelation between the various endocrines as well as in their respective component parts.

If we study the action of the endocrines and their respective hormones and recognize the specific action of the hormone on the body in general and on definite and specific areas and functions of the body, there is no need for introducing into the diagostic or therapeutic sphere any complicated or complicating interest in the autonomic nervous system. We may be able from the standpoint of therapy, by giving gland extract, to supply what is lacking, or to inhibit excessive function of any gland or part of a gland, eventually arriving at rational or exact therapy. However much the endocrines have to do with external form or characteristics, with physical, visceral, and metabolic functions, they have as important and specific relations to the nervous system, to the mind, to the instincts, to the emotions, and to the psyche. And since every gland and its component parts is concerned with each of these spheres, it is well to remember that over or underactivity of any endocrine gland may be limited to or manifested particularly in one, two, three, or more of these spheres of activity. This explains the neuroses and the psychoses. Hence the value of ovarian extract (whole gland), and of ovarian residue in the treatment of persistent corpora lutea and of hyperthyroidism and Basedow's disease.

Among its other functions the nervous system is concerned with activities of a motor and trophic character. To illustrate. If the cells of the anterior horn are affected by toxins, as in acute anterior poliomyelitis, the nutrition of the muscles which they control and govern is affected. We do not know whether the normal nutritional control or domination exercised by these cells is effected solely by impulses of an unknown character sent out to these muscles from the anterior horn cells, or whether the protoplasm of these cells really produces substances analogous to enzymes which reach the muscle fibres along the motor path and so exert a direct nutritional

or chemical influence on the muscle fibre. Probably both forms of energy are operative.

There seems to be a parallelism or resemblance between this action of the anterior horn cells and the all important action of the endocrine organs. These endocrines exercise their influence in two ways: One directly through the autonomic system, of the nature of an impulse stimulus to specific areas of the organism (for instance, pylorus, intestines, uterus, muscles, etc.) again, and this is the all important point, the endocrine substances themselves pass out through the blood and lymph channels directly to these cells, muscle bundles, structures, and nerve ends with whose functions of growth and continuity of function they are specifically concerned.

When an emotion is aroused, the immediate impulse from the central nervous system, be it from the higher cortical centres or those of less pretentious control (those of the medulla oblongata, for example), exerts its initial influence on the endocrines along the autonomic system, and also on the cerebrospinal axis. The latter is required for voluntary and for reflex motor activity acting on the motor system. On the other hand, the visceral structures receive their specific impulses through the autonomic nervous system (vasomotor, sphincteric, in embarrassments, frights, etc.). The latter system likewise carries impulses to the specifically associated endocrines. The outpourings from the latter (endocrines), as they are adaptively stimulated by the various emotions, immediately reinforce and continue the specific type of activity instantaneously called forth by the original impulse. On the degrees of outpouring and on the variety of glands so stimulated depends the behavior of the individual concerned.

If an emotion, resulting in the outpouring of the adrenal secretions, includes adrenalin only, without an associated adequate response by the cortex of the adrenal, and of other glands, the emotion is one of fear or terror. If with the outpouring of adrenalin there is an adequate outpouring from the adrenal cortex, the emotion tends more to that of anger. If with this adrenalin outpouring there is joined an adequate

response by the posterior pituitary, as is the case when the maternal instinct or the sex instinct is roused, it enhances the action of the adrenal medulla or the cortex or both. If the anterior pituitary responds to an emotion, there is the added element of strength, as is likewise the case with the adrenal cortex, but what is more important, the presence of anterior pituitary outpouring adds the elements of judgment and self-possession.

When an emotion is aroused there is a certain action of the autonomic nervous system plus a certain action of the motor apparatus and an associated action in one or other of the endocrine structures. These determine by their response the behavior of the individual concerned and in their various combinations are characteristically described as emotions with definite names; and the psychic behavior as well as the physical behavior are recognized so readily that by the facial expression alone we label the various manifestations as anger, fear, terror, joy, sorrow, etc. The way an individual behaves and gives outward expression to his emotions varies according to his instincts and their makeup and to the endocrine structures, their relative strength, and their associated response, to any stimulus.

A person may ordinarily not be courageous but under a stimulus which rouses an instinct and its associated endocrine activity, into a great emotion, he or she may show the greatest courage and heroism. One may be brave and yet use judgment. Hence it is not always a discredit if we say "He who fights and runs away, may live to fight another day." A courageous individual may be reckless or foolhardy. It is easy to understand how the maternal instinct and its associated gland responses may be so aroused that the outpouring of posterior and anterior pituitary secretion would result in a glorious or brave act when perhaps no other stimulus, acting on any other instinct or producing any other emotion, could prompt this adequate endocrine reserve of energy, force, or physical power.

I consider the anterior hypophysis to be the all-important gland of mental maturity. We know how important it is in association with the thyroid particularly, in aiding and causing proper mental development. But this gland gains in importance in a trophic cerebral sense after the early twenties. The knowledge a person may acquire, the information he may have gained, when put into the melting-pot called experience and amalgamated as it should be into a harmonious, stable combination, may or may not be associated with wisdom, judgment, and philosophy. Some people even at the age of forty or fifty years have the same youthful immaturity of mind as in their younger years. They have gained nothing in mental stability and have profited little if any by experience. Compared with what they might have been and what might be expected of them at this age, they are, so far as wisdom is concerned, hypoplastic, or morons of varying degrees. This comparison is not based on any test as to the ordinary functions of the mind, but is concerned with the question of mental maturity. We might well expect the same varying degrees in the ripening of judgment as we find during the earlier years in the ripening of body-development, mental development, sex-development, etc. There may be no improvement as to maturity of mind, there may be delayed development, there may be a precocious or an unusual development.

The thyroid gland is the gland of energy. It speeds up and activates all the functions and organs, even the tongue. Hyperthyroid people talk more, more continuously or quickly. What is said depends upon the instincts, emotions, and the cerebrum which is being urged to talk. With a poorly-stocked cerebrum, the output is of no importance. With a good cerebrum, well-impressed with knowledge, information, a wealth of good ideas, the lingual output is worth while. The mixture and associations of ideas are personal and give us a good index of an individual's tastes, likes, emotions, and endocrine makeup. If such a mind is abnormally stimulated by both thyroid and adrenals and the person is of adrenal mentality, the ideas expressed are along the line prompted by the instincts

and the emotions with which the adrenals are concerned; such as sports, feats of strength, pugnacity, physical fear, anger, and possibly certain forms of sex questions.

If the cerebrum, stimulated by thyroid, is actively stimulated by the posterior pituitary, thought and talk may be along lines of the instincts and emotions with which this portion of the pituitary gland is associated, such as feminine matters, romance, children, phobias, anxieties, suspicions, or along sex lines.

I believe the anterior pituitary to be associated not only or always with strength of body but decidedly with strength of mind. Its normal activities, so far as its trophic connection with the brain is concerned, lead to mental maturity, to judgment, to philosophy, to self-control. Under associated thyroid stimulation, an individual with such an anterior lobe would show wisdom, and in this class fall the wise, the elder statesmen. Since the anterior hypophysis is a gland whose activities are associated, if we might so say, with intellectual instincts and emotions and with the control of the other instincts and emotions, either or both of these activities lend themselves to the development of brain character of the better sort. The anterior pituitary when dominant and in control, may control the activity or inhibits the activity of the sex glands, the posterior pituitary, the adrenal cortex, and the testis, etc.

Viewing the hypophysis gland from the standpoint of its relation, in a trophic sense, to the genital tract and to sex function, we must take into consideration both the anterior and the posterior lobes. Proper secretory activity on the part of the hypophysis is essential to normal development of the uterus, tubes, and ovaries. The anterior lobe is concerned with growth in general, stimulates the development of the body, bone, muscle, and mind, and therefore includes within the sphere of its activity the sex organs. During pregnancy the anterior lobe undergoes specific stimulation in its structure and activity, and the resulting changes in the gland are so marked and distinctive that after labor, certain of these structural alterations remain. It can be readily understood that the anterior pitui-

tary, as well as other glands, may therefore bear an important relation in the way of stimulation, to growth as regards the embryo.

In the early stages of acromegaly, there appears to be an overstimulation in the genital tract followed later by evidences of diminished stimulation, and thereafter regressive changes and atrophy occur in the genital tract. But this early stimulation is part of the general growth associated with acromegaly and is not more specifically related to the sex organs at this time than it is to other areas of the body. In addition, the posterior lobe likewise is overactive at first.

The subsequent regression in the genital tract is due partly to the diminution of posterior lobe activity, since this part of the gland is much more specifically related to trophic support of the genitalia than is the anterior part of the gland. The posterior lobe, from which is obtained pituitrin, has the well-known action during labor since it increases the force of the uterine muscle contractions. It is the gland whose secretion is responsible for the Braxton Hicks' painless contractions of pregnancy, for the normal rhythmic contractions of the non-pregnant uterus which aid in keeping the uterine musculature normal in character and tone; for the excessive contractions during menstruation which, in so many cases, constitute the physical annoyance called dysmenorrhea. When labor is instituted the posterior pituitary evidences its specific contractile functions in heightened form by producing the physiological labor pains during what is really an endocrine crisis, that is, labor. To develop a uterus normally, a girl must possess sufficient of the trophic element of the various glands which stimulate body growth in general, and among the most important of these is the anterior pituitary. She must, however, possess enough of the trophic element which in addition specifically and regularly produces painless uterine automassage or contractions and this is furnished by the posterior lobe of the pituitary. A lack of sufficient secretion from one or the other or a relative insufficiency of both or of either give us the varied

degrees of infantile uterus, uterine hypoplasia, or delayed development of the uterus

After normal size and development of the internal genitalia have been attained, insufficient action on the part of the posterior lobe is responsible for atrophy of the uterus. While failure of development may be due to a minus of the anterior lobe in the early years, minus of the posterior is in adult life the much more important factor in causing atrophy. My therapeutic endeavors indicate that the administration of anterior pituitary extract in fibromyomatous tumors of the uterus has an action totally opposed to the stimulating trophic effect which the posterior lobe exerts upon the uterus and on menstrual function. To repeat, while the anterior lobe is important in the early years for the development of the genitalia, it is the posterior lobe which is important, especially later, for preserving the normality of what has been developed, and it is in the posterior pituitary that we possess the important trophic factor which through overactivity is responsible for fibromyomata. It is probable that the anterior lobe increases the connective-tissue elements of the uterus and the posterior lobe is related to the muscular fibres. Fibrosis uteri is a result of frequent and repeated pregnancy and it is known that after each pregnancy there is a tendency to an increase of the connective-tissue bundles. In acromegaly the muscular tissue of the body evidences changes of this type. It is therefore conceivable that myomata are due to the posterior pituitary overactivity. Fibrosis uteri and pure fibroids may be due partly to anterior lobe activity. Fibromyomata are due to a combined overaction of the two lobes exerted specifically on the uterus, with the rôle of the posterior lobe as the important factor. Hence in pure fibromata (anterior lobe), there should be less tendency to glycosuria than in myomata, since the latter are due to posterior lobe overactivity. I have a history of three sisters with fibromyomata, on two of whom I myself have operated. The three sisters have the same father. One is born of the first wife, the other two of the second. The point of heredity in this, showing the transmissibility of gland

instability or of gland dominance, is that the father, a man of small stature, shows from the description which has been given, all the evidences of a physical nature of anterior pituitary lobe minus. He is small and so are the children, has had little hair on the face in the way of beard, has little hands and little feet. A son has "nodules" of the scalp.

The ovary has at least two if not four structures capable of producing a secretion: (1) The follicle apparatus. (2) The stroma or interglandular apparatus including those typical interstitial cells said to parallel the interstitial cells of Leydig in the testis. (3) After ovulation is established we have the ripening and rupturing Graafian follicles and the corpus luteum of menstruation. (4) When pregnancy takes place the corpus luteum which gives out the ovum continues to develop for several months, through the reaction and stimulation produced by the decidua and especially by the growing ovum. The secretion produced by the growing ovum is a secretory cell off-throw from its outer covering called the trophoblast. From this trophoblast develop the future chorion and placenta.

Now the follicular apparatus of the ovary is influenced by and related to menstruation. The menstrual and premenstrual activity of the ovary calls into play, and is associated with, activity of the posterior pituitary, the adrenals and the thyroid. The relation of follicular function is particularly dependent on normal posterior pituitary stimulation. It is the follicle apparatus which stimulates the adrenal medulla while the interstitial portion of the ovary stimulates the adrenal cortex and the anterior pituitary. The corpus luteum stimulates the glandular thyroid and is supposed to inhibit overactivity of the posterior pituitary, but it often rouses the post pituitary.

The interstitial ovary is a secretory tissue which acts, probably in association with the immature follicles, long before menstruation is established and this activity is evidenced by the fact that the physical conformation of a girl and the secondary sex characteristics are in evidence before menstruation is established. If we bear in mind the picture of ovary (follicular), adrenal medulla, posterior pituitary, and thyroid

(glandular) as the more predominant relation in the girl, and testis, adrenal cortex, and anterior pituitary and thyroid interstitial, as the more predominant in the boy, we can then readily understand the difference in the shape of the pelvis in the two sexes, a difference in the skeletal structures and in the muscles, the difference in the distribution of hair and fat, and the marked difference in taste, emotions and inclination. In the male we have in the gonads a different relation or type of secretion, especially when we consider what are known as the interstitial cells of Leydig. To the gonads of the boy, before puberty as well as after, must be attributed a secretory action, since it is already then indicated by the differences called secondary sex characteristics. These differences become very evident and more marked as boy or girl advances towards puberty and on through adolescence. And so in the boy or girl deviations to the female type in the boy or deviations to the male type in the girl have a significance which from the standpoint of therapy should not be underestimated.

Therefore there are only two possible explanations for these marked differences in sex characteristics and in the instincts, emotions, tastes, and play of the two sexes. Either the ovary contributes a secretion directly responsible for these secondary sex characteristics (as mammary glands, etc.) or these characteristics result through modifications produced by the glandular ovary in pituitary, adrenals, thyroid, and other glands, or else both factors, as is probable, enter into consideration with the latter factor of most importance.

The gonads of the boy and man either produce a secretion directly responsible for the secondary sex characteristics, the subsequent distribution and growth of beard, etc., or else these effects are produced likewise by gonadal Leydig stimulation of associated glands. It is probable that both factors hold true, with the latter factor of most importance. The ovaries are giving off their secretion from birth on. Ordinarily the corpus luteum of menstruation should appear at puberty, but it, often enough, develops in earlier years and is so responsible for much that has been overlooked.

Early ripening of the ovaries and the girl's early entrance into the menstrual function hasten those changes in the epiphyses which inhibit growth in bone length. This results in shorter stature. This is produced by a stimulation of the posterior lobe of the pituitary and a consequently lesser degree of stimulation or a relative inhibition of the anterior lobe of the pituitary. Tall, thin stature may likewise result from the same form of overstimulation of the adrenal medulla as compared with the cortex. On the development of menstruation, the posterior pituitary and the adrenals enter into still greater play with the glandular part of the thyroid in the processes associated with menstruation. If the posterior pituitary enters early into greater activity than normal, it may to this degree relatively or actually "overtop" the action of the anterior lobe.

Late ripening of female and the male gonads may be associated with tall stature. It is well known that in eunuchs tall stature results after castration. Since the cells of Leydig, etc., no longer stimulate the adrenal cortex, and all stimulation of the pituitary is diminished, adrenal medulla growth in stature takes place. The removal of this pituitary stimulation is of the type which causes a loss of balance, in this sense that the posterior pituitary diminishes in activity relatively less than does the anterior lobe. As a result of anatomical studies in eunuchs there is noted an excessive growth and action of the pituitary and this becomes evident in association with overactivity of the adrenal medulla in changes in the voice, absence of hairiness, tall stature, but not the broad, thick, powerful chest. Primary excessive action of the anterior pituitary instead of stimulating the ovaries inhibits their activity, as I have proven often enough by therapy. So marked is the effect of well-developed acromegaly on the ovaries, since posterior lobe activity is often correspondingly diminished that many have been tempted to consider ovarian insufficiency as the cause of acromegaly rather than the result of the same, and both types of etiology are certainly possible. Just as deficient normal ovarian function may result in increased body-

length because of a relative overactivity on the part of the anterior lobe through lack of proper stimulation of the posterior, so the reverse may be true. It must be remembered that this element of growth in body length is considered during the period of adolescence mainly.

With these and many other facts in mind, it is more than suggestive that the two secretions of the ovary and of the testis act not only by virtue of these secretions exerted specifically on certain areas and processes of the body, but that they do so more decisively by varying degrees of stimulation and inhibition of the associated endocrines, and that differences in the balance between the interstitial and glandular part of ovary or of testis are of huge importance.

Man is more hairy because his gonads act directly on hair growth or more probably because the cells of Leydig stimulate the hair-producing function of the adrenal cortex and the anterior pituitary. Woman is less hairy because the interstitial ovarian secretion cannot so stimulate growth of hair on the face, chin, chest, back, and legs. The interstitial gland of the ovary cannot stimulate this function in the adrenals as much as do the specific cells of Leydig. In addition, however, the glandular ovary stimulates the adrenal medulla and inhibits activity of the adrenal cortex. The glandular ovary stimulates the posterior pituitary and relatively inhibits the anterior pituitary. The interstitial ovary stimulates the anterior pituitary and adrenal cortex and relatively inhibits posterior lobe activity so that differences in balance, if marked, in the ovary have an influence on body growth. The interstitial ovary stimulates one part of the thyroid, the glandular ovary the other, but the corpus luteum of pregnancy stimulates the glandular thyroid and the adrenal medulla, but pregnancy inhibits the posterior pituitary. Overactivity of the posterior pituitary during pregnancy is responsible, at least in part, for nausea and vomiting, for the toxemia of pregnancy, etc. Together with thyroid minus it is responsible for the eclamptic and preeclamptic states. That it is related to the formation of gall-

stones and is responsible for high blood pressure seems quite clear.

Men vary for these reasons in the hairy growth on the body and face and in the type of its distribution. Women vary in the type of distribution of hair and in many, more especially about the menopause period, when there is a rearrangement of the gland relations, there are varying degrees of hair growth on face and chin. Because of an atypical interglandular relation, many women from their earlier years have hair on the arms, thighs, and body of the male type. Therefore, while there may be less hair and beard than usual in many men, there may be more hair than normal on body and face in many women. It is more suggestive to say that in the female, ovarian secretion, by failure to inhibit the specific hair function of the adrenals and the hypophysis, has resulted in hairy growth resembling that noted in men. There is in men more adrenal cortex function and relatively speaking, greater function in the anterior pituitary than in the adrenal medulla and posterior pituitary respectively, though the function of the latter two may be either normal, increased, or deficient. In men, failure to stimulate hairiness points to actual or relative diminution of adrenal cortex function and to actual or relative diminution of the anterior pituitary. With this condition the adrenal medulla or the posterior pituitary activity may be of varying grades.

Now the posterior pituitary, important as is its action in men, is less essential to the sex functions and sex urge in them because of the added effects of the adrenal cortex and the cells of Leydig. The posterior pituitary certainly has a specific action on the uterus during labor. It is partly responsible for the tender emotions in women. Women have smaller hands and feet. They have a typical distribution of the normal fat of the body, they have no beards. Therefore it is rational to conclude that the posterior pituitary, in close association with the ovary, the glandular thyroid, and the adrenal medulla, is responsible not only for the secondary sex characteristics typical of the female, but for her tender emotions and her emo-

tional tendencies. If in a man the posterior pituitary is not overtopped by the anterior, and the adrenal medulla by the cortex, his tender emotions are present.

Since the anterior pituitary, in association with the adrenal cortex is concerned with growth, development of the hands and feet, of bone, of broad, thick chest, and the element of strength, it is suggestive that the male gonads stimulate those glands and make their activities more evident in men than in women. This does not alter the fact that a primary inherited anterior pituitary overactivity or one acquired through intercurrent causes (study, etc.), while associated with growth in stature or growth of mind may not be associated with an adequately good adrenal cortex or gonadal structure.

However much the anterior pituitary, through stimulating general growth, may have to do with development of the uterus, an associated adequate activity of the posterior lobe is of the greatest nutritional importance to the genitalia. The posterior lobe takes a most specific and active part in menstruation and labor, and is the most important causative factor in dysmenorrhea. It is therefore more than suggestions (and therapy in many cases to be reported verifies this contention), that an overactivity of both anterior and posterior lobes up to a certain age is responsible for a large size of the uterus, for elongated uteri, for elongatio colli. After the developmental stage has been passed, the posterior lobe is the important nutritional factor and its overactivity is the most important element in the production of fibromyomata, whereas fibrosis uteri probably bears a relation to anterior lobe activity also.

In my obstetric experience between ten and twenty per cent. of pregnant women evidence to the tactile sense fibromatous or myomatous nodules in the uterus in the latter months of pregnancy. These are distinctly recognized by the external hand after the placenta has been expelled and uterine contraction has taken place. Subsequent bimanual examination confirms this diagnosis. It is remarkable how nursing, as it brings the uterus back to its normal involution, usually aids in the total disappearance of these nodules which may be iso-

lated or discrete, single or generally multiple. Since when the mother nurses, they disappear entirely after a few weeks, as a rule, such as disappear are recognized to be myomata rather than fibromata; such as do not disappear are fibromata. The above discussion serves to illustrate the reason for my referring to the anterior hypophysis as more of a male than a female portion of the gland; it does more work in the development of the body, in the production of strength and maturity of mind, and, in association with the adrenal cortex, and cells of Leydig, and the interstitial thyroid is responsible for masculine instincts and emotions.

The reason for calling the posterior lobe more a female gland than a male gland is because of its specific action during menstruation, pregnancy, and labor, and because its other activities, in association with the adrenal medulla, the glandular thyroid and the ovary and the corpus luteum are evidenced in the feminine instincts, emotions, and psyche.

Hence, in whatever respect or degree a woman resembles the male in body form, size, distribution of hair, instincts, emotions, and tastes, to that degree is my attention attracted to the adrenal cortex or the anterior pituitary or both and to the interstitial ovary.

To whatever degree or extent the male resembles the female in shape of pelvis, hands, distribution of hair, lack of beard, tastes, instincts, and emotions, to that degree do I incline to the notion of actual or relative preponderance of the posterior pituitary and the adrenal medulla as compared to the normal balance expected in his sex.

Among the functions of the adrenal medulla (adrenalin) is the preservation of the tonus of the organs innervated by the sympathetic, and of course to that extent these organs and their function are dependent on the adrenal medulla. It maintains the sugar content of the blood. It is concerned with the regulation of blood-pressure and the distribution of the blood. It increases the excitability of the striated muscles; it relaxes the stomach and intestines, and contracts the pyloric and ileocecal sphincters and the internal sphincter of the anus.

Under conditions tending to induce fear, if the adrenal output is adequate to produce and enhance these normal processes with a certain degree of intensity, and if the cortex, especially if associated with the action of other endocrines, acts in harmony, the individual shows fright of varying degrees, is able to run away and to show judgment. If the added action of the adrenal cortex is of sufficient intensity, the emotion aroused is anger. This is of varying degrees of intensity and is associated with the instinct of pugnacity. If, on the contrary, there is no adequate, associated, balanced response by the adrenal medulla, by the adrenal cortex, or the posterior or anterior pituitary, the emotion of fear becomes that of terror with inability to flee, total disorganization of physical, mental, and psychic processes. The adrenal cortex is among the other gland outpourings necessary to stabilize the above-mentioned physical and psychic processes and the processes produced by action of adrenal medulla and chromaffin system.

Since the thyroid, if normal or overactive, accentuates other functions and emotions, a hyperthyroid person will show to an exaggerated degree any of the emotions dependent on good or faulty endocrine response. The cowardly manifest the physical tendencies to retreat and to flee. In the intense degrees of fright, called terror, there may be even relaxation of the sphincters, a condition which is the reverse of that produced by normal adrenal sufficiency.

The courageous go forward or hold their ground. In the emotion of anger attending the instinct of pugnacity not only does the adrenal medulla functionate actively, but there must be a corresponding activity and stimulation of the cortical portion. In other words, an individual is fearsome in varying degrees primarily according to the degree of adrenal and pituitary response to stimuli. An individual is courageous and bold partly because of good adrenal response, both medullary and cortical.

The type of courage depends on the element of judgment and self-control. A person may be courageous but not foolhardy, or he may be reckless or thoughtless. What would

ordinarily be fear or terror may be manifested as anger or courage if an associated emotion brings into play another endocrine associated with that other emotion. For instance, the posterior pituitary, which is associated with the maternal instinct, will respond when that instinct and its associated emotion are aroused, and it then reinforces the action of the adrenals, for instance, in a state related to fear. In the manifestations of fear, anxiety, suspicion, etc., related as they are to the adrenal medulla and the posterior pituitary, the associated behavior of the cortex and the other endocrines is important in determining the variations, the degrees of severity, and the direction and duration of these states.

Phobias and anxieties associated, for instance, with abnormal or excessive coitus point to weakness or diminution in activity on the part of the adrenal cortex. Then the character of this abnormal state is influenced and determined by the character and interrelation of the anterior pituitary, posterior pituitary, thyroid, etc. The greater is the associated activity of the anterior pituitary, the greater are the judgment and element of control in these states of anxiety. The action of the anterior pituitary in states of anger and under conditions requiring courage assists in directing the course of action. Of course, we must include the previous influence of the anterior pituitary on the cerebrum, etc., as well as its response in an emergency.

The endocrines are therefore closely related to sleep, the production of sleep, to sleeplessness, to the dreamy waking state, and to dreams. The endocrines stimulate, arouse, and recall in the lower and partly in the upper consciousness emotional memory pictures. Whatever action the original event, occurrence, or picture roused in them in the way of response to an emotion, their activity and action during sleep brings back the same or a symbolic picture in the brain.

Now the brain, while it may be likened to a cinema film with the power of recall in picture form of the exposures to stimuli and events, must be thought of as consisting of millions of little paths, each of which, while distinct, has communications with other paths. The path from without inward repre-

sents a point in the brain where an impression was made through any of the senses, a continuation through the brain and through nerves of two kinds: one the nervous system which prompts muscular action, the other, more important for the understanding of our problem, nerves associated with glands and the internal organs of the body, which internal organs and which glands act in a specific manner according to the stimulus. This latter mechanism is the mechanism of the instincts and the emotions, the autonomic nervous system; the former mechanism produces those muscular responses which are likewise typical for the various emotions. This latter action creates a smile, a frown, the tearful face, the attempt to strike a blow, the warding off of a blow, flight, etc.

This outward physical manifestation as well as the impulse to do must be kept distinctly separate from the processes of internal reaction in the heart, blood-vessels, blood-stream, etc., and from the action of the internal secretory glands which, as stated before, act typically in association with the emotions produced by stimuli.

Now the whole problem depends upon several facts which must be held in mind. (1) Repetition of the same stimuli may sensitize the path and sensitizes the reaction. (2) This sensitiveness of any path or paths may be diminished by switching the course of the stimulus into other paths. (3) To whatever degree any path or paths are made oversensitive by use they overshadow other paths and attract into the sensitized paths a stimulus, which, without this element of enhanced attraction or invitation, might have gone into some other path. Therefore any instinct, if it is stronger than another, is so because the mechanism of attraction is more powerful in one field of paths than in other fields of paths. Let us remember that at the end of each path is an endocrine, or endocrines. And since everyone is born with instincts and emotions of varying types and degrees of intensity, stimuli follow what is for that individual the course of least resistance or greatest attraction. Now it is possible to develop and widen and sensitize paths by use. It is possible to anesthetize paths by disuse. It is

possible by diversions or switches to alter the course or path which any stimulus may follow, and the ability to accomplish these results depends firstly on the inborn physical qualities and on the effects of treatment or training, and subsequently on what we call self-control. In other words, during childhood and the early years, the parents should be the switchmen and the flagmen; during the same period and, of course, much more so as the child grows older and in adult life, the individual concerned is his own switchman and flagman.

The whole problem of dreams depends to a great extent upon the theory of a reverse of this action; that is, any endocrine activity which is or has been the end result of a stimulus associated with an experience or an emotion may by a reverse of the primary course be responsible for the recall of the registered stimulus or its like, though this resemblance may not always be apparent. Hence the term, symbolism.

The tremendous error of the Freudian idea is the stress that it laid on the sex instinct. It is a strong instinct, but other instincts and emotions are of as great if not greater importance in their association with neuroses and psychoses. The latter are produced much more often by change in the thyroid, in the suprarenals, in the parathyroids, or especially in the pituitary. The contra-suggestive individual is of all the people in the world most likely to be unhappy. The individual whose instinct of subjection is all too marked may find his lot in life extremely difficult. The too suggestible individual is readily led into temptation. A person with the gregarious instinct strong in him and who spends his or her life on an isolated farm, is apt to be unhappy, and it is the gregarious instinct which takes him or her from the farm to the large city. It is this gregarious instinct which keeps millions of people in miserable surroundings and under the influence of unwholesome conditions when otherwise they might be much happier on a farm. The instinct of curiosity, much as it leads to scientific investigations, leads to most erroneous views of sex questions unless correct interpretations and explanations are given, and if the Freudians have done one thing more than many others

which have done harm it is that they have laid such stress on one instinct and have created misunderstandings and morbid interest in that phase of life which should not play an all important part in the thoughts of the individual. I know many men whose nervousness and irritability are due entirely to the worry about their stock exchange speculations; I could, therefore, if I wished, prove the worry and annoyance and wear and tear on their endocrines to be, as it really is, the responsible factor for the neurosis. I know women who are depressed and unhappy because they have no children. I know women who are nervous and irritable because they have a domineering, contrasuggestive, or unusually self-assertive husband. I know many women who are nervous because of the problems associated with the training and care of their children. But if any or all of these have dreams at one time or another of a sexual nature, are we to forget all the innumerable endocrine plays on instincts and emotions, and center our thought on the sexual sphere, even though, as is the case, the sexual sphere is likewise in many instances responsible for neuroses and psychoses? And, best of all, when we explain to a patient that she or her child is at one or various times under the stimulation of the sex hormones of the numerous endocrines of the body, and that some of her dreams may in many ways be the end result of such activity, do we not remove from such patients the fear and feeling that they are mere animals, unmoral or immoral? And if we are correct in our explanation can we not prescribe gland extracts which inhibit or modify this overactivity? We can.

When a person is exhausted by normal work or exercise and sinks into a refreshing sleep, his endocrines, so far as they are associated with volitional stimulation, likewise go to sleep, particularly the pituitary and thyroid. If an individual as a result of reading, mental activity, or aroused emotions fails to fall asleep, some endocrine activity is stimulating those areas and functions of what are called the upper consciousness, and since it is active, it continues to exert control over the subconscious. A thyroid activity stimulating cerebral action, the

activity of any other endocrine which does the same or makes one conscious of certain emotions, likewise stimulates the upper consciousness, and it often takes people hours to fall asleep. Coffee keeps people awake since it stimulates the thyroid; alcohol may do the same. If you do fall asleep, without cerebral and endocrine activity previously aroused by worries, anger, fears, joys, unsatisfied longings, etc., and the upper consciousness is no longer stimulated, the subconscious sphere may likewise be inactive; you sleep well, you have no dreams, and you awaken refreshed because, at the same time that the upper and lower spheres of consciousness have not been irritated into activity, the sleeping endocrines have been exerting only a normal, wholesome effect on the other functions of the body and cell repair has taken place. But while the upper consciousness is, so to speak, at rest, even if not completely, and you are, as we call it, asleep, if the endocrines exert their play on what we call the subconscious state, you have all varieties of involuntary recall, and since volitional control is wholly or partly absent, the activity of the subconscious may be likened to the saying that "While the cat's away, the mice will play."

Let us make a comparison. During the day the servants in the household may obey your orders and do what you ask them. When once their work is over their behavior below-stairs is like the action of the subconscious state. You may not know what they are doing, but you may hear something if their play or behavior is sufficiently active or exuberant to carry sound to your ears.

Another comparison. An officer drilling a company receives prompt response to his orders. If he and his company retire at night and go to sleep all is peaceful. If a hundred men be given leave for an evening, are left to their own resources, there may be a hundred different forms of behavior if each does what he likes. Several groups may join in different diversions or all may do the same thing in concert, but they certainly will not drill as they did during the day. If the officer is away he knows nothing of what is going

on. If he is with them, and during these hours he attempts no disciplinary control over their enjoyments and behavior, their behavior may be likened to the action of the subconscious state while the upper consciousness is out of action so far as control is concerned. These comparisons are supposed to represent the various types of dreams resulting from endocrine stimulation of the subconscious sphere by endocrines still awake. While any endocrine is exerting its action on the subconscious, of course it may also be acting on the upper consciousness, thus calling its attention to what is going on below, and this is called a dream. And as the various endocrines are associated and brought into action by different instincts and emotions, some purely mental, some those of anger and fear, some sexual, etc., the reverse action or recall will be along the lines of the mental, fearful, sexual, etc., according to the endocrine element or elements which are acting at the time of the dreaming.

When you give bromide to a patient you are diminishing the sensitiveness of the paths, the endocrines, and the cerebral centers. When veronal makes a patient sleep it does so because it, so to speak, puts the endocrines (very frequently the thyroid and pituitary), which are stimulating the upper consciousness, into a state of diminished activity. Therefore, veronal in very small doses is an excellent drug for hyperthyroidism.

When a patient after several hours of sleep awakes and cannot fall asleep again, some endocrine is responsible for the rousing of the upper consciousness, and if we find, by questioning, the nature of the dream which aroused the patient, or the thought or emotion which is now present during this waking state, we can readily discover which of the endocrines are hyperactive at this time. Pain arouses by messages to the cerebrum. Some day when we have analyzed the exact physiological action of the various hypnotics and soporifics we shall prescribe more intelligently for sleeplessness unless, as is probable, endocrine therapy will accomplish this result better.

In pregnancy many patients suffer from nausea and vomiting. Those who do not suffer in this way are, as a rule, rather drowsy or sleepy. In the former there is a rousing of the adrenals, the posterior pituitary, and the thyoid. In the latter there is a relative diminution of activity of the endocrine glands, especially the hypophysis, and we have the mildest form of hibernation produced by the action of placental secretion on the posterior pituitary. If you administer only a few drops of chloroform to a patient in labor after the injection of pituitrin, the uterine contractions become less severe and recur at greater intervals. Therefore, chloroform inhibits the posterior pituitary or its action. Castor oil and quinine have a tendency to bring on labor pains if administered about the expected time of labor. Therefore, they either act directly on the uterus or stimulate the posterior pituitary, or sensitize the uterus to the contractile influence of pituitary secretion. Morphine puts most patients to sleep, but it stimulates some and keeps them awake. Therefore in the former it acts on the upper consciousness and on the endocrine activity, and in the latter it stimulates both. Drug sleep is the result of the artificial hibernation produced, whereas normal sleep is normal hibernation or normal endocrine rest. The endocrines, so to speak, go to sleep. Alcohol keeps some patients awake and in very small doses it puts others to sleep. Alcohol given in varying degrees up to intoxication, removes the control exerted by the upper consciousness and the anterior pituitary, and brings out evidences of the instincts and emotions in different individuals according to the endocrines most stimulated, and we may have an individual fearful, tearful, joyful, pugnacious, quarrelsome, amorous, etc.

I have used ovarian extract, whole gland, always and rarely corpus luteum extract. Corpus luteum extract counteracts the influence exerted by whole ovary, for in the latter the interstitial part (ovarian residue) is of greatest importance. It is the glandular part and the corpus luteum which stimulates the adrenal medulla and the glandular thyroid which are the two gland structures most affected in hyperthyroidism and the

nervous and anxiety states of women. The interstitial thyroid and the adrenal cortex are of the greatest importance and these two special extracts will soon be in our hands. Hence I have used the whole suprarenal gland to get the effect of the cortex and have used testicular extract as an added help where adrenal cortex action was desired. I am now paying attention to the parathyroids whose importance is certainly very great. The question of the pineal is difficult, but some of my cases with suggestion of the Mongolian eyes and face with or without obesity are being watched along these lines. The same balance or question of balance as exists in the endocrines above mentioned exists within the thyroid, the pancreas, the kidneys, in the muscles and bones, in the brain, and in all the structures of the body. As I observe, in cases now being studied, kidney diseases are the result of endocrine abnormality. Goodhart and others have made important observations in muscular dystrophies. If we apply to muscles the question of balance between the muscle bundles on the one hand and the connective and elastic tissue fibres on the other hand we see that the same relation holds good as is observed in fibrosis, fibromata and myomata of the uterus. The same relationship holds in kidney diseases, overgrowth of the interstitial tissue, or of the glandular portion or of both. As to tumors, benign and malignant, they are all due to endocrine action. We shall find that carcinomata are due to different endocrines according to their situation: breast, pylorus, coecum, sigmoid, uterus, etc. The neuroses and phychoses are endocrine as to cause. In a subsequent page the curative action of placental extract, for example, on pituitary psychoses and on other states due to the pituitary and other glands, will be reported. In conclusion let me make this prophecy. In five years there will be few mental defectives (new), few feebleminded (new), few insane (new), few tumors (new), few cancers (new), few diabetes (new), few renal diseases (new), and so on. Since they are due to endocrine aberrations they will be corrected in their earliest stages by endocrines. When the next war comes, if it does at all, soldiers before going over the top will not be given alcohol:

they will be given endocrine cocktails and the adrenal cortex will be an important ingredient. And if the world, in the near future administer to its diplomats, to its highest officials, to its legislators, and to its people the proper endocrines, especially anterior pituitary, and inhibits the adrenal cortex a little bit, there may be no more wars.

Woman is a combination of glandular ovary, corpus luteum, adrenal medulla, glandular thyroid, posterior pituitary, and mammary acting much more energetically and specifically than in man. That is why they have hyperthyroidism, pituitary conditions, and the numerous emotional conditions which we have so long and so erroneously labelled "neurasthenia," "hysteria," when they really are "neuroses," "psychoses." And if we finally conclude, as is probable, that one part of a gland acts through the vagus, and the other part through the sympathetic, then the question of balance is of greatest importance.

Many of the statements above made cannot as yet be substantiated by laboratory investigation. They have, however, stood the more convincing test of therapeutic application.

CHAPTER XIX

THERAPEUTIC SUGGESTIONS CONCERNING ENDOCRINES

The human body is managed by the endocrine glands of the body. You have an automobile, and it is run by gasoline of one kind. In spite of the fact that it has a competent mechanism, if you are short of gasoline, or have a poor quality of gasoline, that invalidates the value of the automobile. But in the human body you have many kinds of gasoline given off by many glands, each gland producing many secretory elements. The particular division of these secretions we do not fully understand, but each gland and its special components has a definite specific action; and every individual from the time he is born until the time he dies is under the influence of these many different kinds of elements—some of them having to do with the development of the bones and teeth, some with the development of the body and nervous system, some with the development of the mind, etc., and, later on—with the introduction of sex features—with reproduction. Still later on, these elements have to do with the preservation of these structures and functions which constitute the body and mind, and if the gasoline elements which are given off these glands become under- or over-active there is a disturbance of the specific functions which these component parts are supposed to perform; and since these glands are dependent on each other, the upset of one disturbs the rhythmical action of the others; so that accordingly a woman during her development and maturity keeps in action as her glands keep in normal action; and as she approaches the climacterium and, later on, the years of senility, her glands change and her activities change, so that if she lives long enough she is pretty nearly back to where her body functions started in the early years.

In recent years our knowledge as to the physiology of the ductless glands has been put to the test by endocrine therapy, and there is no longer any doubt that the future of medi-

cine lies along these lines. In my own practice, endocrine therapy has displaced and replaced the old time drugs, so that I might safely say that practically 90 per cent. of all my prescriptions for internal use consist almost entirely, if not wholly, of endocrine extracts. The varying forms of amenorrhea, most of the menorrhagias and metrorrhagias, threatened miscarriage, habitual miscarriage, sterility, the disorders and disturbances of the climacterium, and many other states met with in gynecological practice may be corrected in many instances specifically by a certain extract; in many other cases, by a combination of extracts.

We know what many of the gland extracts will do, but we have not yet solved the question as to how many various elements enter into the secretions produced by any of these glands. We know the difference between the adrenal medulla and the cortex, between the anterior and posterior lobes of the pituitary, between the interstitial secretion of the ovary and that of the follicle apparatus, and in all probability will some day find the following explanation: Many of these internal glands secrete more than one element, each of these elements acting directly on certain structures, or nerves, or nerve ends, and having definite stimulating, trophic, or inhibiting functions. On the other hand, such of the gland elements as we know have a varying selective action according as they act on the bones, or the muscles, or the mucous membranes, or the musculature of the hollow viscera, or on certain nerves, or on the branches of certain nerves, or on the nerve ends. With either of these ideas in mind it is easy to picture all of the functions of the body carried out by the proper relation between stimulation and inhibition.

The selective activity of the endocrine products is easy to understand. Pathology has taught us much that leads to a proper understanding of physiology. In anterior poliomyelitis there is a selective action by the toxins on certain cells in the anterior horns; in locomotor ataxia there is a selective action of the toxin on the posterior column of the spinal cord; in shingles, some toxin acts on definite nerve roots. Hence it is

no stretch of the imagination to conclude that nature has conferred on the ductless glands of the human body control over practically all its functions by giving to certain elements definite, specific activities.

Whatever sequelæ and complications the internist may find in influenza at the present time, the gynecologist and obstetrician has his attention fixed very decidedly on the endometrium, whether the patient is pregnant or not. I have had several patients, not pregnant, whose menstruation came on early and excessively shortly after an attack of influenza. Several pregnant patients have spotted and stained after slight attacks of influenza. One patient miscarried in the fifth month after a pneumonia; and another, after a slight attack with no pneumonic process.

The endometrium is a lymphoid tissue, and I have come to the conclusion that the uterine mucosa by its sensitiveness to the influenza toxin proves that the disease affects markedly the thymico-lymphatic system, and that when this barrier is passed the toxins act most disastrously on the pituitary and adrenal structures; so that the specialist in diseases of women may readily come to the conclusion that the influenza toxin—from his standpoint, at least—has, if not a selective action on the endometrium, at least a predilection in that direction.

Trophic control over development and growth, and the maintenance of the normal state in the various structures of the body is vested in the ductless glands, and immunity or lack of immunity to various diseases is more than probably one of the most direct evidences of their important functions. Normal relation of these gland elements, whether their action is exerted directly on the tissues in question or upon the structures through the medium of the nerves and nerve ends, preserves a proper state of growth; and the lack of trophic care or an overstimulation of tissue cells and epithelial cells must lead to abnormal growth. In this view of the question, I believe will eventually be found the cause of benign and malignant growths of the body.

Dermoid cysts represent the growth of embryonic elements displaced in clefts during the development of the embryo, or of such elements—located, for instance, in the ovary—which at first dormant, are not inhibited and are at some period stimulated to growth. That many of these cells have lain dormant for years and have then taken on a growth, proves the question to be either lack of inhibitory control or more probably overstimulation.

Chorioepithelioma is, after all, the very best evidence of lack of inhibition or overstimulation in the mother afflicted with this condition. Certain cells of the ovum's outer layer have been retained in a uterus after a miscarriage or a full-term pregnancy, and after a few months, or even after two or three years, these develop into a malignant growth characterized by metastatic deposits carried through the blood channel. It is perfectly evident that these cells have grown either because a protective ferment or element is lacking in the individual in whose uterus these cells have developed the above mentioned growths or because an overstimulation exists which forces these cells and fosters their growth.

The uterus of every woman is the potential carrier of myoma or fibroma. If she bears children and the uterus is engaged in carrying out the functions for which it is prepared by the action of the ovary, thyroid, pituitary, and other glands, there is certainly less likelihood of fibroma or myoma developing through hyperpituitarism than if she have no children.

For instance, we have the pituitary gland, especially the posterior lobe, which is often hypoactive. We know that a woman grows stout, menstruates less and less, and has an atrophy of the uterus and ovaries, often permanent, when the posterior lobe underacts markedly for a long period of time, this condition being called dystrophia adiposogenitalis. Therefore, on the basis of both theory and practice, we know what hyperactivity of this lobe should produce. It overstimulates both ovary and uterus, and in all probability is the cause of fibromata and myomata of the uterus and of the condition known as fibrosis uteri, in which condition, at operation, the

ovaries are found large and hyperplastic and certainly are overactive.

There are so many manifestations of hyperpituitarism that are probable but not yet definitely settled, that it may seem almost theoretical to mention some of these states. For instance, many cases of dysmenorrhea are cases of hyperactivity of the pituitary lobe at the menstrual crisis. Again, I recently operated on a patient suffering from what was diagnosed as prolapse of the uterus, the cervix appearing at the vulva. She had had no children, in fact, was unmarried. I diagnosed it as a case of elongatio colli, with retroflexed uterus. The uterus was more than twice the normal length. I amputated the cervix at the level of the internal os, and the amputated cervix was certainly over three inches long. In talking on this case during this step of the operation, I stated that this condition, as well as fibroids and fibrosis of the uterus, was an evidence of some hyperactivity of the posterior lobe. When I opened this patient's abdomen in order to correct the retroflexion, I found a large uterus with a fibroid the size of a walnut on the fundus. This, of course, might have been, unless my theory is right, simply a coincidence, but I believe the above expressed view to be the correct one. I have recently had a parallel case in a married but multiparous patient. The elongation of the cervix was nearly four inches. She had a very large subperitoneal fibroid. Her general symptoms are those of posterior pituitary plus.

I wonder if the following case is to be viewed as merely a coincidence: Patient, married six years, 2-para, menstruates every twenty-eight days, duration four to seven days, large in amount. Her premenstrual phenomena are sleeplessness and frequency of bowel movements, which have become more marked in the last year. Her blood pressure was 140, and my diagnosis was hyperpituitarism, combined possibly with hypothyroidism. In asking her whether she had nursed her second baby, born two years ago, she replied, no, because the baby had suffered from pyloric spasm and had been operated upon for the same. If the whole question of heredity is, as I be-

lieve, mainly a matter of inheritance of endocrine relationship, then this hyperpituitarism in the mother and pyloric spasm is more than simple coincidence.

We know that the history of a patient's premenstrual phenomena constitutes one of the most important diagnostic aids in all gynecology, for at this period, which is a crisis, interglandular malrelations are brought into the foreground. Many patients suffer from marked headaches at and during this period; others suffer from nausea and vomiting, and these undoubtedly represent overactivity on the part of related glands, among which the pituitary is often overactive at menstruation.

When a patient is pregnant and the menstrual activities of the ovary, thyroid, and pituitary are nullified and held in check by the placental secretion, we have a constant struggle between these two—secretions of the mother and the secretion of the ovum—during the entire 270 odd days of pregnancy. If the placental secretion cannot hold the maternal secretions in check, the latter assert themselves and the patient has a miscarriage. This is the explanation of repeated, habitual miscarriages, and hyperpituitarism, posterior lobe, plays an important part in this condition.

Many pregnant patients are not nauseated at any time while they are carrying an ovum *in utero;* others are nauseated in varying degrees. I have frequently noted that many patients who are not nauseated are quite drowsy and sleepy. I am accustomed to tell such sleepy patients that this is a favorable sign, as nausea is not a probable annoyance from which they will suffer. This nausea and vomiting represents a reaction on the part of the system to the introduction of the placental secretion. If a stable adjustment results quickly, the nausea disappears quickly. In this readjustment, undoubtedly (in the cases which vomit and vomit decidedly), we are concerned either with a toxic influence produced by the placental extract or with an exaggerated reaction on the part of the posterior lobe, with resulting hypersensitiveness of the gastrointestinal tract. How great a part transient forms of pyloric spasm play in this persistent nausea and vomiting remains to

be decided. Those patients who are sleepy and drowsy (and these are not nauseated nor do they vomit) have the opposite condition—an underactivity of the posterior pituitary lobe.

I have formerly considered fibrosis to be due to hyperactivity of the ovaries. Now that we know the special relation of the pituitary to the ovary and the uterus, we realize that at the menopause period, when gland activity as it relates to the sex-structure should diminish, the pituitary gland may, on the contrary, remain active or hyperactive. This will give at the menopause period ovaries which do not regress, a uterus which is overstimulated, with the result that the patient has a menorrhagia or metrorrhagia, a large uterus, and large ovaries at a time when atrophy should be in view. Therefore, the study of any change occurring in a patient at the climacteric period (many of these changes begin years before the menopause comes on) must concern itself with the question of regression. If ovary, thyroid, adrenals, and pituitary gland diminish in activity harmoniously and in the same ratio, the patient develops amenorrhea, atrophy of the genitalia, with no symptoms of hyperpituitarism, or hyperthyroidism, hyperadrenalism, or hyperovarianism. If ovarian regression is too rapid for the body needs, we have flushes, due to sudden loss of ovarian stimulus, and to continued posterior pituitary activity; we may observe hypothyroidism, if the same condition takes place previously in the thyroid; or hypopituitarism, if the hypophysis shows the same rapid decline. The reverse, that is, overactivity, in one or other of the glands is just as frequent, if not more so, in the cases seen by the gynecologist.

When we consider that one or other of these glands, not forgetting the adrenals and other secretory structures, may regress much more quickly or more slowly than the others; and that various combinations of these processes may take place, we see that we may have in any patient various combinations of hypearactivity or hypoactivity which need not be permanent but which may change and fluctuate at this period, so characterized by instability that the laity have well named it "change of life." It is no rare thing to see a patient during

or after the menopause suffering from alternating hyperthyroidism and hypothyroidism, and the same is true concerning the pituitary and the ovary, and in the pituitary we have the basic element of high blood pressure if the thyroid be minus.

In the condition, to which we have already referred, known as dystrophia adiposogenitalis, the patients are very sugar-tolerant and may be given large amounts of glucose without sugar appearing in the urine. By theory and by observation, it must of necessity be concluded that overactivity of this lobe will make the patients very slightly tolerant of sugar, and this is undoubtedly one of the important causes of glycosuria. We know the relation of the pancreas to glycosuria, but we have not, in therapy, at least, given sufficient attention to the relation which the ovaries, and more especially the thyroid, the adrenals, and the pituitary, bear either to the pancreas directly or to the sugar-forming or sugar-retaining qualities of the body. Therefore many patients with fibromata and myomata have glycosuria, many of them have tachycardia, which means either a coincident involvement of the thyroid or adrenals or tachycardia from hyperpituitarism indirectly.

Whether this overactivity of the pituitary has anything to do with gallstones, I do not know. I believe this to be the case. We do, however, observe frequent association between fibromata of the uterus, the postpartum period, and stones in the gall-bladder.

In gland therapy we must realize that it is easy to administer the extracts when any gland fails in action. We simply supply what is needed. The more difficult and eventually glorious part is to overcome the hyperaction of any gland; and this must be done by selecting those other extracts which counteract or antagonize this activity.

In searching for endocrine elements that are antagonistic to the posterior pituitary lobe, we may take these three points into consideration. Mammary gland function and mammary gland extract certainly have the effect of diminishing menstruation, contracting the uterus, shrinking fibromyomata, and

limiting the activity of the ovaries. We must presume that it may have the same effect upon the posterior pituitary lobe.

The thymus has the effect of controlling the activity of the gonads until the developmental age comes on, after which the thymus is supposed to regress and allow the sex arrangements to develop. We know, then, that thymus extract, if given therapeutically, will in certain cases diminish menorrhagia and metrorrhagia through action on the ovaries, and that thymus extract has value in quieting sex sensations. It may have an effect on the posterior pituitary lobe.

When a woman is pregnant, the placental secretion inhibits the menstrual activity of the ovary, of the thyroid and the posterior pituitary lobe. Therefore we may have in placental extract a secretion that has some controlling influence over the posterior pituitary lobe. If this be so, it should help us in the treatment of dysmenorrhea due to posterior lobe hyperactivity, and should help us in those cases of glycosuria due to the hyperactivity of the posterior hypophysis gland. I have helped, not cured, many patients suffering from dysmenorrhea, by giving placental gland extract by mouth and by hypodermic. I have had remarkable results in several cases of glycosuria at the climacterium, seeing the urine clear up and the sugar disappear by the administration of placental gland extract, with very little restriction of the diet.

We may then conclude that certain forms of glycosuria, if they be dependent on pituitary lobe hyperactivity, should react and improve if placental extract be given.

If the mammary gland and the thymus, in addition to acting on the uterus and the ovary, also inhibit the posterior lobe, they should be tried, if not in other forms of glycosuria, at least in the form of which I have just spoken. How many cases of hypertension or increased or raised blood pressure, especially those noted in women at the menopause or subsequently, are due to hyperactivity of the posterior pituitary lobe remains to be decided. Judging from therapeutic results thyroid minus and posterior pituitary plus form the most frequent endocrine cause of high blood pressure. At this menopause

or climacteric period, when the activity of the ovaries is supposed to diminish, when there should be and often is regression in activity on the part of the thyroid, we expect that the posterior lobe will regress too, since the patient's sex activity is no longer of importance. This regression, however, often fails to take place.

My purpose in setting down these views is to direct attention to the possible value of thymus extract, mammary extract, and especially placental extract in those conditions due to hyperpituitarism, among which are certain cases of glycosuria, many cases of high blood pressure and many abnormal psychic states and many psychoses.

The influence and activity of the endocrine glands are evidenced by the stimuli and the changes produced on the body, on metabolism, on the nervous system, on blood pressure, and on the psyche. In some instances abnormalities of gland activity are characterized by physical stigmata; in others, by changes in the activity of organs whose function is continually under the influence of the nervous system; in still other individuals, abnormalities of gland activity are evidenced by changes in the psyche; and in some, combinations of various forms are in evidence.

Ovarin.—It seems strange that after all the tremendous amount of experimental work which has been done, and after all of the verification which physiologic and pathologic investigations have given in the pursuit of this topic, there should still be physicians who doubt the existence of an ovarian secretion. They readily grant the tremendous importance of the thyroid and the suprarenal structures, and are now beginning to recognize the important rôle of the hypophysis. Recognition of the importance of the thyroid and adrenal apparatus was probably furthered by the therapeutic results obtained by the secretions of these glands, used experimentally or medically. The fact that up to date no ovarian secretion has been marketed, which produces in the same short space of time marked or noticeable effects, possibly accounts in a measure for the failure to grant to the ovaries the place they deserve as most

important factors in the female economy, aside from their very important function of producing ova. At almost all periods of life the thyroid, the pituitary, and the suprarenals especially, are intimately concerned with the vital daily processes to a greater or lesser degree. Whereas the ovary exerts its influence over a very extended period of time in channels and ways which show no decided alterations, but only gradual but lasting phenomena, it must be granted by everyone that removal of the ovaries in young animals or young human beings stops complete development of the mammary gland and the external and internal genitalia, especially the uterus. In adult women, removal of the ovaries is followed by atrophy of the internal genitalia, most particularly the uterus. At the climacterium regressive changes in the ovaries are followed by atrophy of the genitalia. These factors are universally known, and they are generally recognized as resulting partly through the failure of a secretion produced by the ovaries.

The ovary has a remarkable effect, too, in influencing the form of bony growth in the female. It produces the female type of pelvis; it has to do with the degree and extent of skeletal growth. It is intimately concerned with the changes produced in osteomalacia. It has an intimate relationship with the thyroid, the thymus, the adrenals, and the hypophysis, glands which are extremely important in the processes of bony growth and ossification. The alterations produced in the ovary in acromegaly are so decided that, in the minds of many observers, they are the primary factors in the production of this disease. The same holds true in the cases of giants and dwarfs. All these, and innumerable other points, which I have previously mentioned, prove the great importance which the ovaries bear in the general economy; however, to be sure, scarcely vital. The most important, and, in my mind, extremely important, relationship in women exists between the ovary, the pituitary, the thyroid and adrenals. Many years ago my attention was attracted in this direction by the observation that, in many cases of ovarian hypofunction in young women, there were symptoms of a digestive and general nervous nature that implied a

toxic irritation by some other secretion. The study of the changes produced at puberty, before menstruation, before and during the climacterium, taught me that in innumerable cases we were dealing with actual or relative hyperthyroidism, and I gave to that class of patients, in whom an excess of thyroid was due to hypofunction of the normally antagonizing ovarian secretion, the name of relative Basedow's disease. Many of these cases manifested their annoyances in association with menstruation—that is, usually in the premenstrual phase—and it is important in this type, of what might be called constitutional dysmenorrhea, to distinguish between the cases due to overactivity of the corpus luteum secretion itself, due to its being in excess, so to speak, and the type where the annoyances are due to an actual excess of thyroid secretion and the type due to hyperpituitarism. We may distinguish three types: (1) The annoyances are due to too much corpus luteum secretion; (2) there is normal stimulation, by either pituitary or thyroid secretion in a patient with an extremely hypersensitive organism; (3) there is real hyperthyroidism or real hyperpituitarism posterior.

The diagnosis between the annoyances due to excessive pituitary stimulation on the one hand, and hyperthyroidism stimulated by the corpus luteum secretion, may be in many instances readily made by the use of ovarian extract and of thyroid extract. Any patient suffering from this premenstrual dysmenorrhea of a constitutional type due to hyperthyroidism is made distinctly worse by the use of thyroid extract, 1/10 to 1/2 grs. three times a day. Any patient whose premenstrual annoyance is due to the presence in the blood of an excess of the pituitary hormone is benefited by the exhibition of thyroid extract. Annoyances due to corpus luteum stimulation are benefited by ovarian extract or ovarian residue. In this type of case, and in cases of a nervous nature, at whatever age or stage, I have for years made use of the thyroid extract for diagnostic purposes, and have unearthed thereby many cases of relative and actual hyperthyroidism, and have seen several of these patients subsequently develop distinct signs which

absolutely verified the diagnosis. In my experience, ovarian extract is a valuable drug. Lutein extract has given me good results in menorrhagia, but the indications are different. I find that ovarian extract and ovarian residue are of great value in the minor degrees of hyperthyroidism, especially the forms depending on hypofunction of the ovaries. It is a very valuable drug in lactation atrophy of the uterus. It has given me for years very good results in the flashes of the climacterium, especially when begun early and combined with placental extract. If begun shortly after operation, there are few cases of castration who suffer very much from the so-called flashes. In the few cases of chlorosis which have come under my observation, and in the many cases of anemia, it has served me very well. I learned many years ago to combine iron and arsenic with ovarian extract in almost every indicated case, especially where the hemoglobin was reduced, and, on the other hand, in cases of anemia, where the iron was the primary indication, I almost invariably added ovarian extract. So that I have adopted for myself the rule when you give iron also give ovarin; when you give ovarin also give iron. I find that each accentuates the action of the other. In amenorrhea, relative or absolute, it has been my standby for years. The type in which least influence on the amenorrhea is obtained is the precocious menopause of obesity, which I am now beginning to consider in many cases as a dystrophia adiposogenitalis, dependent on a disturbance in which hypophysis minus plays an important part. Ovarian extract is a drug which must be used for a long time, and one which must be judiciously combined with other drugs. It produces no annoyances, and the main contraindication consists of profuse bleedings. I have, in many instances, combined ovarian extract with thyroid, especially to promote metabolism and encourage oxidation. The annoying symptoms produced by thyroid extract are often surprisingly diminished by adding ovarian extract. For therapeutic purposes I have learned to give small doses of thyroid extract, 1/10 to 1/6 gr. three times a day, often producing

splendid results. For diagnostic purposes I have given larger doses.

Thyroid

Thyroid is often given in too large doses. One should rarely begin with more than one-tenth of a grain three times a day. And one grain three times a day should be a maximum dose, and then only after several weeks in pronounced myxedema. Many patients can only stand one-twentieth of a grain.

In rheumatism and allied states one-tenth of a grain three times a day is a prophylactic dose, and one-quarter of a grain three times a day is a therapeutic dose. These very small doses are sometimes of value in chorea.

Thyroid is valuable in certain forms of menorrhagia and in renal and intestinal hemorrhage.

The huge number of cases of hyperthyroidism are transient, and recover readily with appropriate medication and treatment. Change of climate, rest, administration of various gland extracts, etc., are of value.

The milder nervous symptoms include excitability, a change of habits, and taste. There may be glycosuria, pigmentation of the skin, sweating, and vasomotor instability of the skin. There may be a fidgety and nervous manner. Premenstrual nervous symptoms are the rule, especially if the post. pituitary is overactive. The condition is generally pluriglandular. Hyperthyroidism must be viewed as a pluriglandular condition, involving especially the adrenals, the pituitary and the ovaries and the symptoms, both physical, visceral, metabolic and psychic, vary for that reason. The thyroid is composed of a glandular and interstitial tissue and symptoms vary according to the degree to which these are involved.

Physical or mental strain should be avoided. Rest in bed for a few weeks is advisable, on account of the tachycardia or muscular weakness or the nervous irritability and the other symptoms.

The various emotions rouse the thyroid to activity. The same is true of the sexual sphere and of the various diseases

of the genitalia. Arsenic, the iodids, coffee, tea, and alcohol, and the salicylates stimulate the thyroid.

The thyroid is quieted by rest and quiet, freedom from sexual relations, and correction of pelvic annoyances, a milk diet and glycerophosphates, belladonna, bromids, and especially opium and ergot.

We may use ovarin, ovarian residue, extracts of the pituitary gland, thymus, suprarenal, placental extract, according to the indications peculiar to each case. Thyroid extract should be contraindicated. Extract of suprarenal gland seems to work well especially when combined with ovarian extract or ovarian residue. Ovarian extract, gr. 5, three times a day, is very valuable. It may be given for months or years.

R. Ext. glandulæ suprarenalis ..... gr. ij
Ovarian extract ..... gr. v
S.—One capsule t.i.d.

Sodium phosphate, one teaspoonful every morning, is also very good. Sodium glycerophosphate is very valuable. Ergot and digitalis aid the relaxed heart.

The thyroid is stimulated by small doses of iodin, and it also stimulates the cerebrum and cerebration. In Basedow's disease the iodin is decreased in the gland and is in excess in the blood. Iodin is attracted to the cells of the thyroid. In small doses it has a tendency to stimulate the gland and cause absorption of retained secretions. The specific action of iodin in goiter (not exophthalmic, not hyperthyroidism) results only if functionating gland tissue is present, and hypertrophy will recede if dependent on improper function or retained secretion. In parenchymatous goiter, where all the constituents are enlarged, a potassium iodid ointment is often efficient. Potassium iodid is of value in simple goiter, causing it often to disappear, but it usually makes Basedow's disease worse.

Polyglandular Combination.—"This includes patients showing unmistakable evidence of ductless gland disorders. In acromegaly there is a frequent co-existence of a goiter. There is early glycosuria, amenorrhea, pigmentation, and

asthenia, suggesting affections of the thyroid, the pancreatic islets, the ovary, and adrenals. These organs are all involved, either by the underlying biochemic disturbance which is the background for many ductless gland disorders, or else they are secondarily implicated during the compensatory readjustment of metabolic processes consequent upon the primary derangement of the gland in question. A primary hypophyseal derangement is capable of bringing about a functional unsettling of the entire glandular series" (Cushing).

"In the case of the thyroid and parathyroids the pituitary and pineal bodies, the adrenals, thymus, pancreatic islets, testis and ovary, disturbances of function, whether in the direction of increased or of lessened activity, will doubtless occasion reciprocal alterations in one or another of the correlated glands. Despite the ultimate polyglandular nature of the picture from the pathologic point of view, a primary disturbance of each one of these glands, whether in the direction of overactivity or underactivity, doubtless will be found to possess its own characteristic clinical syndrome, which differs from that of each of the other glands."

"As a result of experimental reproduction, the symptoms associated with primary glandular insufficiency are the better known. Cretinism, myxedema, Addison's disease, pancreatic diabetes, parathyroid tetany, and the eunuchoid state are clinically recognizable. To this is to be added the dystrophia adiposogenitalis, due to hypophyseal deficiency and possibly hypothymism and hypopinealism." (Cushing.)

There are constant changes in the hypophysis during pregnancy. This gland is enlarged, and there is an increased secretion in pregnancy on the part of the anterior lobe. Tandler and Gross compare the frequent changes in the face of pregnant women, especially the coarseness of the features, with the same changes occurring in acromegaly. It is exclusively the anterior lobe of the hypophysis which is altered in pregnancy. (?) It is possible that the periosteal bony growths of pregnancy are due to the changes in the hypophysis. Whether the enlargement of the thyroid in pregnancy stands in relation

to the hypertrophy of the hypophysis cannot be definitely stated, neither can the question be answered whether the enlargement of the hypophysis may not be hypertrophy designed to substitute the lack of function of the ovaries. It is also possible that the change in the hypophysis is the result of changes in the uterus (ovum), and is designed to inhibit the function of the ovaries, or the changes of the hypophysis and the ovaries may be due to a common cause."

The thyroid enlarges and is stimulated before each menstruation by the corpus luteum. This stimulation persists for several months and is the greatest protection the pregnant patient has. This activity of the thyroid helps to hold the posterior pituitary in check and thyroid extract is the guardian of the kidney epithelium. In the infectious diseases as scarlatina, influenza, etc., the kidneys are involved by toxins the more readily if the thyroid be inefficient or if it be injured by the toxins. Pituitary posterior plus, and thyroid minus, are the basic factors in eclampsia, in high blood pressure, and in many psychic states. Pituitary posterior plus and thyroid plus do not give high blood pressure, but are responsible for many psychic states and for Basedow's disease.

CHAPTER XX

THE HISTORY AND THE SYMPTOMS

If married, how long?

Number of children—If sterile, how long were precautions taken and form of precautions?

Miscarriages? Curetted?

Curettings?

Operations? What done?

Labors: Instrumental? Torn? Sewed?

Nursing: How long a period of Amenorrhea during lactation?

Infectious diseases during childhood? Measles, Scarlatina, Whooping-cough, Mumps, Pneumonia, Diphtheria, etc.

Menstruation:

When first established?

Was it regular?

Was it associated with pain?

At what intervals?

What infectious diseases since menstruation was established?

How were you at school? Standing?

Did you have to be taken out as result of overwork?

Menstruation Now:

How often?

How long does it last?

Are there clots?

Is there pain? When?

Last menstruation?

Menopause? How long? In what form did it develop? Flushes?

Premenstrual Phenomena:

How many days before any menstruation can you tell that you are going to be unwell?

What are the physical symptoms? Breasts full? Feel discomfort down below? Any pain or cramps before menstruation appears?

What are the premenstrual mental and nervous phenomena?

Headache?
Nausea?
Excitability?
Irritability?
Depression?
Blues?
Do you cry easily?
Are you cross with your children?
Are you sensitive?
Different from your behavior at other times?

Intermenstrual State:

Palpitation?
Any headaches?
Dizziness?
Any intermenstrual pain?
Pain on right or left sides?
Pain in the back?
Any sensation of dropping down?
Constipated?

Urinary Condition:

Frequent urination?
Painful?
Amount in 24 hours?

General Questions

Palpitation?
Heart burn?
Any form of indigestion?
Are you excitable? Irritable? Nervous? Depressed?
Have you any fears? Any anxieties?
Have you gained in weight since marriage or have you lost?

Are you menstruating as much, or more, or less, than formerly?

Are your premenstrual annoyances acquired or did they always exist?

Tell me in three words the most important annoyances that brought you to me?

Instincts: Pugnacious? Gregarious? Fearsome? Curiosity? Tastes? Domestic? Fond of books and home? Fond of children? Sex instinct or urge?

Sleep: Long to fall asleep? Wake up after certain hours of sleep? What keeps you awake or prevents you from falling asleep? Flow of thought? Fears? Worries? Anger? Longing? Dreams? Character of dreams?

Observations

Observe the eyebrows; a poor development of the outer half implies a lack of thyroid; shaggy and heavy eyebrows attract attention to the anterior pituitary and to the adrenals.

Bulging eyes suggest hyperthyroidism and hyperpituitarism.

A good bridge of the nose means a good thyroid.

A broad nose calls attention to the anterior pituitary.

A good firm lower jaw suggests the gland that produces acromegaly,—as does wide spacing of the teeth.

Regular teeth imply balance between the anterior and posterior pituitary.

High arch and crowded teeth suggest overactivity of the post. pituitary.

Yellowish color of teeth calls attention to the adrenal cortex.

Teeth crowded together, with a high arch, means relatively more posterior than anterior pituitary.

Absent, abnormal, or small lateral incisors speak for abnormal or poorly developed gonads and internal genitalia.

Thyroidal teeth are firm, white, with good enamel,—often transparent, with a suggestion of bluish tint.

In anomalies of the thymus, and of the thyroid, and of the parathyroid, because of the calcium disturbances, there is poor enamel, and with the parathyroid disturbances there may be lateral erosions of the enamel.

Adrenal cortex plays a part in the growth of body and bones.

Adrenalin diminishes the elimination of calcium. Parathyroids regulate calcium metabolism and the calcium contents in the nervous system. Thymus aids the assimilation of calcium by bones. Thyroid and pituitary aid in regulating the elimination of calcium.

Adrenal teeth are often dark with a tinge of yellow or green.

Long pointed canines indicate a fighter or "scrapper," and are to be referred to the adrenals. Short, small canines suggest the opposite.

Wisdom teeth in their character, eruption, and date of eruption are probably related to the anterior pituitary.

A real "peaches and cream" complexion, and doll-like face, flushing and blushing, attract attention to the activity of the thyroid and posterior pituitary.

Hair on upper lip, on the face or chin, suggests adrenal cortex action, as do moles.

Pigmentations, moles, freckles, attract attention to the adrenals.

Dark skin, red hair, demand a special study of adrenal activity.

The skin of many asthmatics shows deposit of pigment.

Asthma is referred by some to the thyroid. Others look to the adrenals as an important relation. Still others to the hypophysis.

From my own limited experience, I believe that the posterior pituitary must receive important consideration.

A quick pink line on stroking or scratching the skin indicates normal adrenal relationship.

If the skin is stroked with a pinhead, or the finger nail, or the finger, a white line may remain, or it may grow pink

quickly or very slowly. If this manipulation produces a red line instantly or quickly, it speaks for a good or over-active thyroid, a good or active posterior pituitary, or both. If a white line remains or turns red slowly the adrenals are to be thought of. Since this test shows the relation of the sympathetic and the vagus, we must consider the part of the body tested, as the vegetative system has cranial, lumbar and sacral branches. (See page 281.) These tests are only suggestive.

Small, delicate, shapely hands, speak for a posterior pituitary not overshadowed by anterior lobe activity.

Larger hands, hair on the arms, suggest anterior pituitary.

Soft, delicate skin, with no hair on the arms, speaks for thyroid and posterior pituitary and no marked adrenal cortex.

Dry, scaly skin speaks for lack of thyroid.

Broad, thick chest, well developed frame, speak for anterior pituitary, even though the posterior be normal in other respects.

The greater the male characteristics in any fashion, the greater has been the relative action of the anterior pituitary and the adrenal cortex.

The pubic hair of the female has a horizontal upper border. The pubic hair of the male has a pyramidal upper border, extending up toward the umbilicus.

Cold hands, poor circulation of the hands, especially during cold weather, speak for a lack of thyroid, whereas warm hands and feet and moist skin speak for good or overactivity of the thyroid. The hyperthyroid person may stand the warm or humid weather badly.

A tired feeling, fatigue, so often described as neurasthenia, may be divided into physical and mental asthenia. Physical asthenia suggests the status lymphaticus, or a failure of proper adrenal action, a deficiency of the thyroid,—and here the young and adolescent should not be forgotten,—or it implies an over-active thyroid with excessive basal metabolism.

In hyperthyroidism there is increased stimulation of the autonomic system by the thyroid.

Exophthalmos is, in my opinion, an evidence of overactivity of the posterior pituitary.

The adrenals are profoundly affected in the severer forms of hyperthyroidism and the adrenal test of Goetch, in my opinion, is caused by or is an evidence of the adrenal involvement, and is not an accurate or adequate test of hyperthyroidism as such.

The thymus is markedly involved, the more severe is the form of the hyperthyroidism.

Thyroid stimulates the chromaffin system; hence the frequent association of medullary hyperadrenalism with hyperthyroidism; under these circumstances suprarenal extract which contains the cortex of the adrenals is indicated to overcome the overactivity of both the thyroid and the medulla.

Thyroid increases the excitability of the autonomic nervous system. Parathyroid through its relation to calcium metabolism and the calcium content in the nervous system diminishes excitability; hence a diminution of parathyroid secretion, allowing the escape of calcium, increases the degree of excitability.

The genuine cases of Graves diseases are all pluriglandular, and so are many of the forms of hyperthyroidism without exophthalmos. In fact, there is no such thing as a uniglandular involvement.

Adrenalin inhibits the pancreas; hence with any diminution of chromaffin activity, the power to assimilate carbohydrates is increased, because here also inhibition over the pancreas is removed.

The thyroid inhibits the islets of the pancreas; hence in hypothyroidism the power to assimilate carbohydrates is increased, since the inhibition over the pancreas is removed.

When both thyroid and pancreas are removed, glycosuria results; hence the combination of thyroid minus and pancreas minus may mean glycosuria. In hyperthyroidism, however, the pancreas, if it does not yield to inhibition by the excess of thyroid and by the action of the chromaffin system, may not, as is expected, be productive of glycosuria.

Hyperchlorhydria and the so-called "heartburn" of pregnancy are probably due to hyperthyroidism. Many claim that it is due to diminished adrenal activity and that small doses of suprarenal extract relieve the condition.

Thyroid increases gastric peristalsis.

Adrenal activity checks the activity of the stomach.

Thyroid inhibits the pancreatic islets.

Adrenals diminish pancreatic activity.

Thyroid stimulates metabolism.

Adrenal inhibits activity of the intestinal muscle.

Thyroid stimulates metabolism.

The adrenals inhibit metabolism.

Thyroid checks activity of the pancreas. Therefore the hypothyroid patient having an over-active pancreas is able to digest the carbohydrates, etc., in larger amounts; hence the craving for sweets. Such a craving is said to be characteristic of pituitary inadequacy.

Too much adrenal medulla inhibits the gastric secretion; adrenal cortex substance probably increases the peristalsis of the intestine.

Judgment, wisdom, taste for books and literature, interest in the important problems attract attention to a good anterior pituitary.

Fondness for children, normal libido, and feminine traits point to the posterior pituitary.

Excessive activity, restlessness, desire for excitement, mental and physical "wanderlust," the jumpy type of individual suggest overactivity of the thyroid or of the posterior pituitary or both.

Receding gums, pyorrhoea, long teeth, suggest posterior pituitary activity.

Varicose veins suggest posterior pituitary overactivity.

Fibroids or fibroid nodules of the uterus speak likewise for posterior pituitary plus.

Occipital headaches, radiating behind the ears, down the neck, the spine or along the sciatic region, speak for post. pituitary plus.

Diphtheria and influenza are especially prone to affect the adrenals.

Children with good thyroids acquire fewer of the child's diseases, with the possible exception of measles, and stand these infections well.

The pneumococcus affects badly the chromaffin system of the adrenals.

The pneumococcus may profoundly influence the gonads.

Mumps readily affects the gonads.

Syphilis seems to take a more severe form when the pituitary is inefficient.

Tuberculosis not infrequently means abnormal adrenal relation or balance.

If pregnancy is associated with thyroid minus the danger of toxemia and eclampsia and increased blood pressure is enhanced.

Reference is to be made to the interglandular changes and readjustments of puberty and the adolescent period. Here we have the introduction of the specific sex glands (the gonads). This is a period of growth and increased activity in preparation for the most active period of life. It is as truly a change of life period involving physical, visceral, mental, physic and endocrine phases as is the period known as the climacterium.

When a woman goes through the so-called "change of life" period, there is a rearrangement of the glands and their relative degrees of dominance are altered. If they all regress in equal ratio and their former normal balance is well preserved, the woman goes through this trying period with few if any manifestations of a physical, functional, or physic nature. But if the rearrangement has not been one of parallel retrogression we have all the innumerable variations during which the anterior or posterior pituitary, the thyroid, the adrenal cortex, the adrenal medulla and the other ductless structures of

the body are so changed in interrelation that they produce innumerable combinations, according to their overactivity, underactivity, and interactivity.

These changes are of varying significance and meaning according to heredity, inherent instincts and emotions and according to their play up to this period.

And so the picture may be dominated by hyperovarianism (interstitial or glandular), hyperpituitarism (anterior or posterior), hyperthyroidism, hyperadrenalism (cortical or medullary); or by hypoovarianism (interstitial or glandular), hypopituitarism (anterior or posterior), hypothyroidism, hypoadrenalism (cortical or medullary); or by various interminglings and continued changes of interrelations.

The flushes of the menopause period and those which take place after the removal of the ovaries or on atrophy of the ovary or ovaries retained after hysterectomy, are due not only to the absence of the ovarian interstitial secretion but to the overactivity of other glands acting on the vasomotor system, and the overactivity which is most responsible for the flushes is to be referred to the posterior pituitary, and associated are the adrenals.

Therefore ovarian secretion, related to the posterior pituitary function and to the adrenals, is in a degree responsible for upset of balance in this vasomotor phase. The interstitial gland stimulates the adrenal cortex function.

Because of its importance let me repeat that there is a great difference between the action of adrenal medulla and adrenal cortex, between anterior pituitary and posterior pituitary, between the interstitial ovary and the glandular portion.

The adrenal medulla and the adrenal cortex represent a balance as is the case with the anterior and posterior lobes of the pituitary. As the anterior pituitary plays the greater part in the male than in the female, and as the posterior pituitary plays a greater part in the female than in the male, so does the adrenal cortex play a greater part and is more active in the male than in the female. Since the adrenal medulla is associated with the other chromaffin structures in the emotion of

fear, and since the whole adrenal stability is less in the female than in the male, and since post pituitary action is more marked in the female, so is the female more subject to fear.

When action of the cortex is associated with action of the medulla, fear is less marked and pugnacity or anger is more marked. Phobias imply a lack of sufficient action or supply of adrenal cortex, and of anterior pituitary and excess of posterior pituitary and adrenal medulla. Since the adrenal cortex is stimulated by the cells of Leydig and these two secretory glands are closely related to the anterior pituitary, so is the instinct of pugnacity the greater in men. With this characteristic in women, attention is called to the interstitial ovary and adrenal cortex.

If these changes are productive of alterations of a predominantly physical type, they are manifested to the eye. If the changes are productive of visceral alterations, they have their specific symptoms evidenced, for instance, by the pulse-rate, gastro-intestinal functions, the amount of urinary excretion, etc. If the manifestations of altered gland activities are psychic, we have all the variations in the way of overexcitability, irritability, states of depression, states of anxiety, etc., up to the grade of psychosis.

Any or many of the changes, such as those visible to the eye, the internal alterations in visceral or circulatory or metabolic function as well as the varying psychic deviations from the normal, may be intermingled.

The changes may be slight or great, temporary or lasting, evanescent or more or less permanent. For these reasons it is no wonder that the period of the climacterium is a most trying one.

The libido or sex urge may be increased or diminished or altered at this period. When increased, as it may be, it speaks in all probability for a relative or actual increase of the posterior pituitary.

Acromegaly

This condition, due to excessive activity of the Ant. Hypophysis, is frequently associated with abnormal function of the

thyroid, increased action of the interstitial glands; very often with loss of the genital function *after preliminary transitory increase,* and often with hyperplasia of the supra-renal cortex. *Important Symptoms*:

The nose is very much thickened.

The malar bones protrude.

There is a spreading apart of the teeth.

Enlargement of the upper jaw.

Enlargement of the lower jaw.

The mucous membrane of the tongue is thickened.

There may be increased muscular strength in the early stages,—shortly followed by rapid increase in the way of fatigue, due to marked muscular weakness. *Such muscles show increase of connective tissue, and degeneration and atrophy of the muscle fibres.* (Falta.)

The growth of hair on the head is increased and the individual hairs are thick.

The hairiness in women assumes the male type.

After early stimulation, there is a diminution in the function of the ovary.

Varying degrees of hyperthyroidism may be associated with acromegaly.

A slight degree of arterio-sclerosis is an associated phenomenon.

The cardiac muscle undergoes degeneration and enlargement. (Falta.)

There is a frequent tendency to glycosuria or diabetes mellitus (due to excess of post. lobe). Bandler.

Rheumatoid pains are frequent, and the pains often occur during the night.

There are sensations of heat in the fingers.

In many cases there is a mental apathy, a lack of initiative, and a slowing of the speech.

Acromegaly may be combined with hyper- or hypo-thyroidism.

The rise in blood pressure which follows pituitrin (post.

lobe) generally disappears after short repeated injections; whereas that of adrenalin, with the same methods, persists.

Pituitrin acts a diuretic. (Overactivity of the pituitary posterior may diminish the amount of urine, Bandler.)

HYPO-PITUITARISM

Accumulations of fat in definite locations.

Marked obesity.

Atrophy of the interstitial glands and the glands of generation.

Occasional retrogression of the secondary sex characteristics.

In the early years there is inhibition of growth and inhibition of ossification.

Polyuria.

There is in these patients restlessness and resignation; so that in spite of headaches they are gay and happy.

This gay temperament contrasts with the stupidity and moroseness of hypo-thyroidism in childhood.

In hypo-pituitarism there is a lack of interest.

There may be psychoses. (Falta.)

TETANY

Tetany represents an abnormally increased condition of excitement of the nervous system, demonstrable in a heightened excitability of the motor, sensory, and vegetative nerves with painful spasms. The manifestations are the result of an insufficiency of the parathyroid glands. (Falta.)

The most typical symptom is the tetanic spasm, usually affecting the upper extremities. There may be spasms of the eyelids, of the mouth, yawning spasms, strabismus, involvement of the larynx, *causing laryngo-spasm.*

In children the sensorium may be clouded.

In acute cases there are occasionally hallucinatory confusion or deep depression.

There may be abnormal psychical excitement, or even depression.

The vegetative nerves are excitable, or there is increase in tonus.

In the acute stages there is pronounced dermographism.

There is frequently observed pain in the bones or joints.

After injection of adrenalin in the acute stages, there is increased blood pressure, heart action, and the vessels of the skin are contracted. (Falta.)

The face becomes pale as well as the entire body, and there is palpitation.

In the acute stages of tetany in adults there is marked pallor.

There are muscular spasms of the fingers and toes, and there is a characteristic puffiness of the face.

The facial pallor differs from the livid color of myxoedema. (Livid—black and blue; of a lead color; like a bruise.)

There may be disturbance of the gastro-intestinal tract.

It is possible that tetany increases the pyloric spasm or causes it.

In acute tetany there is irritability of the central nervous system, of the peripheral nerves, and of the vegetative nervous system. (Falta.)

MacCallum finds diminished calcium contents in tetany, with increased elimination through the kidneys and intestine.

The hair, the nails, the skin, the enamel are trophically disturbed.

There is a tendency to falling out of the hair.

There is a tendency to the formation of cataracts,—and there is hypoplasia of enamel, causing the formation of horizontally transverse ridges.

The incisor teeth are the most sensitive, showing opaque spots on the anterior surface.

There is a tendency to the association of hyperthyroidism.

Falta states that the cause of tetanic changes lies in the ganglion cells of the spinal cord,—even though the higher centers are hyper-excitable.

The coindence of tetany and myotonia has been ascribed to insufficiency of the parathyroids, but Falta considers myotonia an affection of the muscles, and the symptoms of tetany resembling myotonia he explains on a metabolic basis.

It is stated that individuals who in early years have passed through tetany later often become epileptics.

Osteomalacia is supposed to be associated with overactivity of the parathyroids.

Thymus Gland

Thymic hyperplasia, status lymphaticus, narrowing of the arch of the aorta, resulting in death, are viewed as a vegetative disturbance to which is given the name of lymphatochlorotic constitution.

An abnormally large thymus without status lymphaticus is called a status thymicus.

Status lymphaticus is associated with a hyperplasia of the chromaffin system.

Thymus hyperplasia is frequently found in Basedow's disease, acromegaly, pituitary dystrophy, myxoedema, etc.

It is found with both hyper and hypo-function of the other glands. (Falta.)

Thyroid

Two lobes on either side of the trachea connected by an isthmus. Contains follicles lined with epithelium and filled with colloid containing the specific secretion which is absorbed into the circulation through lymph channels. The iodine content is high. (Falta.)

Thyroiditis; often associated with and resulting from acute infectious diseases. It may lead to hyperthyroidism and Basedow's.

May be affected after operation, during pregnancy, after labor, etc.

Basedow's (a pluriglandular disease)

Increased activity of the thyroid; generally enlarged.

Tachycardia, exophthalmos, tremor, digestive disturbances, nervousness, increased metabolism.

Vegetative system excited.

Rare in children; eight times more frequent in women than men; often familial.

Plus or minus often associated with neuroses, diabetes and phychoses as family characteristics.

Blood pressure normal or low.

The administration of thyroid lowers blood pressure.

Reddening of the face, ears, tips of the fingers, due to poor peripheral tonus.

Increased sensitiveness to adrenalin on the part of the sympathetic.

Scratching of throat, irritating cough.

Increased frequency of respiration, air-hunger,—paroxysmal and early.

Tremor increased by psychic emotions; *produced or increased by the administration of thyroid.*

Headache and especially insomnia may be the initial symptoms.

Mental. Irritability, gaiety without cause, hasty speech, rapid flow of thought, changes of mood, mistrustful, capricious, elated, depressed.

Attacks of vomiting, watery diarrhoeas, increased diuresis.

Increased saliva; diminished saliva.

Coagulation time of the blood is increased and lengthened.

Mononucleosis which is increased on the administration of thyroid (mononucleosis diminished in hypothyroidism).

Neutrophiles diminished.

"The thymus is hyperplastic in forty-five per cent. of Basedow's dying of intercurrent diseases, and eighty-two per cent. of Basedow's dying of the disease itself, and nearly one hundred per cent. dying on operation. Death probably due to status lymphaticus or failure of chromaffin organs." (Falta.)

Emaciation frequent (in rare cases obesity).

Appetite often increased, yet emaciation results through increased caloric production stimulated by thyroid excess.

(Tremor diminished by hyoscine.) Change in the metabolism due to increase of the tonus of the vegetative nervous system and the heightened activity of the organs which supply it.

Caloric production increased. Disturbance in the regulatory mechanism that governs the taking up of nutrition. Disturbances of stomach and intestines.

Albumin exchange is increased. More albumin is needed to maintain nitrogen equilibrium.

The exchange after injection of food is abnormal, the metabolism is especially labile. The administration of albumin perhaps increases the activity of the thyroid.

Combination of Basedow's with true diabetes is not rare.

Hyperthyroidism favors a predisposition to glycosuria. Hyperthyroidism possibly inhibits the secretory activity of the pancreas.

Glycosuria disappears with retrogression of the hyperthyroidism.

In normal individuals the action of thyroid extract on gas exchange, albumin, and the carbohydrate metabolism is often intense, while in other individuals it has little if any effect.

Thyroid gland secretion increases the elimination of phosphorus through the intestine. The abnormal distribution of phosphorus to the kidneys and intestine is called forth by an increase of the calcium elimination by way of the intestine.

In many cases of Basedow's disease there is a pronounced polyuria.

The temperature in severe Basedow's may be associated with transitory rises of temperature.

The skin is delicate, pliable, moist, readily reddened, through a lively play of the vaso-motors.

Increased sweating is almost constant.

Pigmentations are found in half of the cases on the eyelids, lips, throat, nipples, axillae and linea alba, occasionally on the genitalia. Edematous swellings may occur of the eyelids or extremities. They do not pit on pressure. (Falta.)

Falling out of the hair is frequent. The nails are sometimes fissured.

Youthful patients show an exhilarated growth in height and a premature closure of the epiphysial junctures.

The skeleton is usually slender.

Basedow's and rheumatoid-arthritis may occur together.

Alterations in menstruation occur. Amenorrhoea may be an early symptom. The thyroid increases in size during puberty and pregnancy.

Frequent tachycardia at puberty.

In Basedow's the hair may be dry but it is thin. In myxoedema it is thick, loose and brittle.

A Basedow's case may go over to myxoedema.

Thyroid and hypophysis may be affected at the same time, and many of the so-called myxoedema symptoms in Basedow's may be due to hypophysis minus.

The iodine content of the thyroid gland is larger than that of the skin, lungs, ovaries, small intestine, blood, liver, bile, hair and the anterior hypophysis. (Falta.)

The thyroid glands of new-born children are iodine-free.

Copious feeding of meat to dogs makes the thyroid gland poor in iodine and the glands of carnivoræ have the lowest iodine contents.

Scleroderma occurs in Basedow's.

Symptoms common to both myxoedema and Basedow are certain forms of edema, dryness and grayness of the hair, pigmentations, etc. Certain cases of Basedow may have a dry skin and occasionally a glycosuria may develop in myxoedema. These differences depend upon varying degrees of tonus of the sympathetic or of the autonomous. (These are possibly due to the interstitial and glandular thyroid which are antagonists. Bandler.)

Excitation predominating on the part of the vagus or of the sympathetic nerves gives two forms. 1. Vagotonic; slight tachycardia, Graefe, wide palpebrial fissures, sweats, diarrhoeas, hyperacidity, disturbances of respiration, no alimentary glycosuria. 2. Sympathicotonic; exophthalmos, marked tachy-

cardia, no sweats or diarrhoea, marked falling-out of the hair, no disturbances of respiration, positive alimentary glycosuria. (Falta.)

In certain cases the differences depend on the predominance of one or the other of the two systems.

Applying to the sera of Basedow's the reaction of Abderhalden, Lampe finds in the sera ferments against ovaries, thyroid and thymus only.

Plummer divides goitres with symptoms of intoxication into 1, exophthalmic; 2, non-exophthalmic.

1, is true hypertrophy and hyperplasia of the gland tissue.

2, is increased parenchyma, through regenerative changes or new formation with increase of secretory action and absorption.

Sea-coasts are almost free from goitre and cretinism.

Myxoedema

Diminished function of the thyroid, diminution of all vital processes of body and mind, slowing of metabolism and of excitability. Trophic disturbances affect especially the ectoderm, skin, hair, nails and teeth and the vascular system (*premature arterio-sclerosis.*) (Falta.)

Skin—Myxoedematous swelling of the entire body, especially cheeks, lids, nose, supraclavicular fossa, neck, back of hands and feet. Cheeks, nose and lips may be blueish-red.

Voice—Harsh; singing impossible.

Skin elastic (no pitting), dry and scaly.

Hair of the head and beard, eyebrows, axillary and pubic dry, brittle, tend to fall out. Tendency to baldness, nails dry and cracked.

Circulation—Sluggish, sensation of chilliness, pulse small and weak and slow; dyspnoea occurs easily. Excitability of the sympathetic nerves diminished, hence failure of sweat secretion.

Often marked arterio-sclerosis.

Mental sluggishness, retardation of psyche, inability to form rapid conclusions, *slow and monotonous speech*, dullness,

brooding, sleepiness, little reaction to strong stimuli. Memory for recent events poor.

Psychoses vary. Depressed types predominate.

Frequent paresthesia and rheumatic pains.

Blood—Decrease of red cells and hemoglobin. Increased coagulability. Mononeucleosis and hypereosinophilia.

(Often illusions, hallucinations, frank psychoses.)

Metabolism markedly reduced.

Urine diminished, often slight albumin. Increased tolerance for sugar.

Combinations of myxoedema and diabetes very rare.

Lowered temperature.

Irregular menstruation. Either amenorrhoea or menorrhagia.

Hypophysis often disturbed.

Minor forms produce muscular pain, backache, lassitude in the morning, constipation, amenorrhoea or menorrhagia, the hair begins to fall out over the occiput. Occasionally thyroid obesity.

Cretinism may be congenital or develop in early life.

Thyro-aplasia is shown early in the first year of life. Infantile myxoedema appears in the fifth or sixth year of life. We may have thyro-aplasia, thyro-hypoplasia, and later and in adults thyro-atrophy.

Retardation in bone development produces proportional drawfism with delayed closure of the fontanelles, and a circumference of skull *of greater proportion than the height.* Retraction of the root of the nose through lack of growth of the vomer. (Falta.)

Disturbances in dentition.

Umbilical hernia.

The skin is myxoedematous. In older cases atrophic.

The limit of the hair-zone is far back on the forehead.

The palatine arches are high; tonsils and adenoids.

Breathing slow. Marked under development of genitalia, external and internal.

No pubic and axillary hair.

Testes do not descend or descend late and are smaller.

Blood—Hemoglobin reduced. Increase of mononuclears. Reduced polymorphneutrophiles.

Bone disturbances are not in the epipheses alone, *but in the bone marrow.* Slight status lymphaticus.

Hypothermia.

Thymus gland often hypo.

Absence or backwardness of mental and psychical development. *Inability to balance head, to sit and to walk; that is, movements of finer co-ordination.* (Falta.)

Hearing may be diminished or absent.

TABLE OF KOCHER

Cachexia Thyreopriva	*Morbus Basedowi*
Absence or atrophy of the thyroid gland.	Swelling of the thyroid gland—mostly of a diffuse nature, hyper-vascularization.
Slow, small, regular pulse.	Frequent, often tense, rapid, now and then irregular pulse.
On application of cold to the skin all vasomotor changes are absent.	Extraordinary irritable vascular nervous system.
Listless, quiet gaze without expression or animation.	Anxious, unsteady gaze which is choleric on fixation.
Narrow palpebral fissures.	Wide palpebral fissures, exophthalmos.
Retarded digestion and excretion, poor appetite, few demands.	Abundant evacuations, mostly abnormal appetite, increased demands.
Slowed metabolism.	Increased metabolism.
Thick, non-transparent, folded, dry to scaly skin.	Thin, transparent, finely injected, moist skin.
Short, thick fingers often broadened at the ends. Sleepiness and tendency to sleep.	Long, slender fingers with pointed end phalanges.

Deficiency of thoughts, listlessness and loss of emotivity.	Sleeplessness and disturbed sleep.
Retarded sensation, apperception and action.	Accelerated sensation, apperception and action.
Awkwardness and clumsiness.	Flight of thoughts, psychic excitement as far as hallucination, mania and melancholia.
	Constant unrest and haste.
Stiffness of the extremities.	Trembling extremities, increased mobility of the joints.
Remaining behind of bone growth—short and thick, often deformed, bones.	Slender, skeletal build, now and then weak and thin bones.
Constant feeling of cold.	Unbearable sensation of heat.
Retarded, heavy breathing.	Superficial breathing with deficient inspiratory expansion of the thorax.
Increase of body weight.	Reduction of body weight.
Senile appearance, even when the patients are young.	Youthful luxuriant body development, at least in the initial stages.

Adrenals

Supra-renals are made up of cortex and medulla. The medulla is chromaffin.

Accumulations of chromaffin tissue exist independent of the supra-renals.

Accumulations of cortical substance are found at the hilus of the kidney, in the renal substance, along the supra-renal veins, and in the internal genitalia.

Either cortical or medulla cells may be carried down with the descent of the genital organs.

Adrenalin. (Falta.)

It influences muscular power.

The function of the cortical system (which to the gynecologist is important, Bandler), is not generally known.

It acts as a toning influence on the autonomous nerves, and may be an antagonist of the chromaffin system. (It is, Bandler.)

Of all the infectious diseases, diphtheria toxin has the most injurious effect on the supra-renals.

Adenomas of the supra-renal cortex are associated with hyperfunction of cortex.

Tumors of the Supra-renal Cortex cause a premature development of the entire organism, in many respects similar to that observed in the development of tumors of the pineal gland.

The majority of the supra-renal tumors affect girls, and the result is excessive development of the secondary sexual characteristics and of the external genitalia. There is frequently adiposity, accelerated growth, and accelerated ossification and dentition; the development of the psyche, and the sexual instincts do not keep pace.

When cortical tumors develop in the *fully developed organs* there are pronounced disturbances of the functions of the sex glands. There is involution of the uterus, and tendency to obesity, to the development of hairyness of a masculine type. In pregnancy hair begins to grow in places that represent the male type.

It is probable that there is a hyperplasia of the supra-renal cortex in acromegaly, and in acromegaly there is often abundant hairiness.

Hyperplasia of cortex causes rapid growth of the organism; premature development of the secondary sexual characteristics; of the genitalia; and in adults, abnormal hairy growth. (Falta.)

Supra-renal Medulla

Hyperplasia of the chromaffin tissue produces *a tall, weak individual.*

The association of multiple skin fibromata with tumors of the supra-renal medulla is extremely suggestive and the rôle of the pituitary must not be overlooked (my own statement).

Interstitial nephritis is associated with an increase of function of the chromaffin tissue. It is possible that the same holds true in the arterio-sclerosis of diabetics. (Falta.)

With hyperplasia of chromaffin tissue there may be increased diuresis and increased amount of sugar in the blood.

Adrenalin increases the blood pressure, shallows the respiration, increases the excitability of the striated muscles. It *relaxes* the stomach and intestines, and *contracts* the pyloric, ileo-coecal, and internal sphincter of the anus. (Falta.)

It contracts the uterine muscle.

It produces hyperglycemia and glycosuria.

It acts mainly on the sympathetic nerve ends.

The function of chromaffin tissue is to maintain normal excitability of the sympathetic nerves.

It is concerned with the regulation of blood pressure, distribution of the blood; preservation of the tonus of organs innervated by the sympathetic; maintains constant the sugar of the blood, and is intimately related to metabolism. (Falta.)

ADDISON'S DISEASE.

Loss of weight through gastro-intestinal disturbances.

Pigmentation; especially apt to begin on the border of the lids, about the nipples, the linea alba, genitalia, and anal folds, the folds of the palms,—but the palms, soles, and nail beds usually remain free. (Falta.)

Mucous membrane may show pigmentation,—on the borders of the lips, mucous membranes of the cheek, soft palate, and on the borders of the tongue.

Low blood pressure; low sugar content of the blood, and tolerance for grape sugar.

Lack of strength; mono-nucleosis, or the status lymphaticus which sometimes belongs to the chromaffin apparatus.

The cortical system is responsible for the disorders of

the gastro-intestinal tract, the vomiting, the diarrhoea, the psychic alterations, convulsions, delirium, and coma. (Falta.)

These distinctions are not yet verified.

It is possible that both the cortex and the chromaffin take part in pigment formation.

The symptoms of acute Addison's may be that of unusual slowing of the fully tense, slow pulse; violent intestinal colics occurring in attacks; failure of peristalsis; and ISOLATED INTESTINAL DILATATIONS.

CHAPTER XXI

CLINICS

Post-Graduate Hospital

March 12, 1920

Case. The patient is a woman, 32 years of age, married three years, who came to this clinic for sterility. For the last two years she has had pain in the left lower abdomen, intermittent, but not influenced by menstruation. Menstruation began at 18, regular every four weeks, moderate in amount, lasting three days, without dysmenorrhea. Last menstruation February 16th. Bowels regular; urinary frequency not increased.

Note that the menstruation did not begin until 18; that is a late development. What is the most marvellous part of this history? That her bowels move every day and she does not have to take cathartics. So far as the sterility is concerned, we can make no definite diagnosis as to the cause until we have examined into the matter of the spermatozoa. It is always wise to do that before considering the use of the curette, and yet I have seen patients curetted twice and even three times when the spermatozoa were absent. That such things have been done and are still being done is very little to the credit of the medical profession, and I have often said that I wished that before any doctor was allowed to use the curette he would have to get a permit from the local Board of Health and give his reasons for wishing to use it. If the partner has no spermatozoa, there is nothing more to be said. If the partner has spermatozoa, there is enough in this patient to be the cause of sterility. Don't forget that she did not begin to menstruate until 18 years of age. That is a very late development of the menstrual function.

The patient states that she had none of the usual children's diseases. She also says that she had an operation a year ago for "stretching."

When a patient begins to menstruate at 18, not having

had any of the diseases of childhood, you have to think of simply internal physical and endocrine conditions that are not produced by accidental factors. Don't forget that measles, and scarlatina, and diphtheria, and mumps in particular have a marked effect in influencing the endocrine glands; and don't forget that many persons do not have these children's diseases, or, if they do, have them very lightly,—just because their endocrines are protecting them. You know the Schick test shows that some persons are immune to diphtheria. You know that diphtheria affects the adrenals badly, and those children whose adrenals are badly attacked do worse. If the individual has an influenza pneumonia, it hits the endocrines that are protecting him, whether the adrenals or the thyroid or pituitary, etc., if they come up to the mark, it is all right; if not, the patient dies. The time will come when we shall treat these patients with hypodermics of endocrine extract,—but not the adrenal medulla always; it is the cortex you often need, which is just as valuable. For years I have discontinued the routine use of adrenalin, for it hurst more patients than it helps; it is not the adrenal medulla you want in many cases, but the cortex.

On examining this patient we find a fairly normal position and size of the uterus. She has on both sides cystic ovaries, and they are cystic to such a degree that the outer surface is nodular like this. You may have a cystic ovary with the outer surface perfectly smooth and regular, or you may have an irregularly shaped surface, feeling like little tubercles. Both of this patient's ovaries are affected in that way. It is quite probable that she does not throw out ova. We must await the examination for spermatozoa before we can go further with this case. Some day you will have a great respect for cystic ovaries, and more particularly for the various kinds of cystic ovaries. I told you I would talk to you this morning on endocrines. I am not going to talk about Basedow's disease, nor exophthalmic goitre, nor any of the various forms of Basedow's disease, toxic or otherwise. I will just mention hyper-

thyroidism, which is as good a name for over-activity of the thyroid as you could wish to have.

You know the pituitary gland has an anterior and a posterior lobe, and there is a middle area too, concerning which we are not definitely informed. You know that the adrenal has a cortex, to which very little attention has been paid, but to which I have been paying a good deal of attention with the most interesting and promising results.

You know that in the ovary you have the interstitial portion, to which little attention has been paid, but to which I have been paying attention for years. It is the part between the follicles. You know that we have the follicular ovary, and so you see three different endocrine glands, at least, composed of two distinct anatomical parts with distinct secretions, having absolutely different effects.

We have been working along with the thyroid for years asleep to the fact that the thyroid has also two secretions, the interstitial and the acinous or glandular, and that is where we expect in the next few months to get a still more definite distinction than the general ones we have had heretofore.

I am not saying anything today about the parathyroids, nor the pineal gland, nor the spleen, etc., we are just going to devote our attention to these four glands for the time being, and as I talk to you I will talk about the thyroid in its entirety, for the finer division has yet to be worked out more definitely.

The thyroid is as essential to the development of the body and mind and the sex organs as any of the other glands of the body. You know the signs of thyroid cretinism; you know how the mind, the brain, fails to develop; you know the signs of the total absence of the thyroid, and you know the signs of infantile and adult myxoedema. You also know the so-called signs of Basedow's disease, and as you compare the diseases called myxoedema and hyperthyroidism you see that they are totally opposite. With too much thyroid you will get a rapid pulse; too little will give a slow pulse; while too much will give a moist skin; too little will give a dry, scaly skin; while thyroid plus will give too much activity and stimulate the

brain so that the patient talks or is excitable; with thyroid minus, it is just the opposite. The same holds true with metabolism,—with thyroid plus it is exaggerated; with thyroid minus it is under normal. All the conditions that come from thyroid plus will be exactly the opposite with thyroid minus.

Now take the element of talking. Of course it depends upon what kind of brain it is that controls the talking. If it is a brain like Roosevelt's the talking and thinking is very much worth while; but the man or woman who has not been educated or has not a brain that acts properly or that is not acted upon properly by other glands, may talk as much but the output will differ very much in quality. Now Roosevelt had a wonderful thyroid and adrenals and a very wonderful anterior pituitary. He had the paternal instinct in the maternal way, and that shows that he had a good post. pituitary. You can tell that from his letters to his children.

Now the question is: thyroid disease of all grades is eight to ten times more frequent in women than in men; that refers more particularly to the greater division, such as the real operative thyroid cases. The thyroid will not be operated upon so much in the next few years as it has been in the last few years,—neither for that matter will fibroids. Why do women suffer from hyperthyroidism so much more frequently than do men? A woman has ovaries and a man has the male gonads or testes. Outside of that and the mammary they have the same glands, although their division is totally different.

The anterior lobe of the pituitary does more work in a man than in a woman; the interstitial part of the gonad which is in the testis, the cells of Leydig, does more work in the man than in the woman, and a certain part of the thyroid does much more work in man than in woman. The posterior pituitary lobe does more work in a woman than in a man; of the adrenals, the medulla does more work in a woman than in a man; the follicular part of the ovary does more work in a woman than in a man; and a certain part of the thyroid does much more work in a woman than in a man; so that the anterior pituitary, adrenal cortex, interstitial gonads and interstitial thyroid are

male glands; the posterior pituitary, the adrenal medulla,—the follicular part of the ovary, and a certain glandular part of the thyroid are female glands. Any man who has more of the female part of his glands developed than is normal to man, to that degree does he tend to go over to the woman side in external type, characteristics, tastes, etc.,—so that every one of us is the expression in looks, appearance, action, and behavior of the action of the little glands that are furnishing us and have furnished us all our lives with hormones, and those of us who are good do not have very much reason to be proud of it, and those of us who are weak have no reason to be too depressed about it,—for what we are has been given to us by our fathers and mothers, and influenced by our environment, by infections, etc., etc.,

The law cannot as yet, however, take that into consideration; for our own self-protection limits must be established beyond which no one can go without restriction, for the benefit of society,—but some day we will be much more charitable toward the weak and the criminal and not waste too much of our praise and idolatry on those who have been good and great.

Now why are the thyroid diseases so much more common in woman than in man? What is the answer?

It is because of the ovaries. Logically, it can be nothing else. If the other glands are relatively the same except as to proportionate development, and the male has the testes and the woman has the ovaries, it is logical that the primary condition must rest in the ovaries,—and that is why gynecologists have always been rather sympathetic toward these hyperthyroid or hypothyroid states, and that is why they see them so often and see them in a form and at a time when no one else sees them. If the condition is bad enough to be a Basedow's disease, the patient may go to a physician or surgeon; if it is very slight, she goes to no one; but if she is nervous and upset, she immediately thinks, as all women do, that something down in the pelvis is responsible for her nervousness and so she goes to a specialist, and in that way

these frequently unrecognized latent hyperthyroid cases come to the gynecologists.

I have just now in my bi-manual examination put my finger on that little recognized but really most important little cystic ovary. When you have a cystic ovary, you have follicles which have never ruptured, and if a follicle does not rupture then an egg cannot come out and the patient is sterile. Is that right?

Then you have in the ovary corpus luteum rests and corpus luteum cysts. Now, we are getting warmer all the time. The ovaries act in every little girl from the day she is born, just the same as the pituitary does, just the same as the thyroid does, just the same as the adrenals do, just the same as the parathyroids do, just the same as do all the other glands,—but we did not know it, and why not? Because we have been accustomed to think of menstruation as the only evidence of ovarian activity; but menstruation is not ovarian activity alone. If these ovaries were not helped by the pituitary, by the thyroid, by the adrenals, etc., girls could not menstruate; so when the twelfth, thirteenth, or fourteenth year does come, each menstruation is initiated by the ovaries, but with that there must be the help of the other glands; and if that girl has a posterior pituitary minus sufficiently inadequate to give her what we call a dystrophia adiposo genitalis, then the uterus and the ovaries do not develop and she does not menstruate, and you can give her all the ovarian extract and other combinations possible and you will get no response unless you give the right ones. Or supposing you have a thyroid anomaly; the ovaries immediately respond and are often injured; when the thyroid is overactive it may injure or depress the ovary. In other words, dependent as the ovary is on thyroid stimulation, the thyroid and the ovary are at the same time at the opposite ends of the balance, and while each stimulates the other, an excess of either over-stimulates the other: and with any two glands or parts of glands which are related to each other in the degree of "You tickle me and I tickle you," if one of them gets too strong it inhibits the other, and vice-versa.

You and I might be playing at wrestling,—or little kittens, or bears, or rabbits may be playing; and the play of one stimulates the other. I may be very much stronger than you, but if I modify my muscular activity I will not hurt you; but if I get away from the spirit of play and exert my full power, down you go; or if we happen to be unevenly matched and the other one gets angry and is (then) more powerful than I am, down I go,—but in the normal play or activity each stimulates the other to the proper degree. Any two glands that act upon each other must have a balance maintained between them in every normal economy, if they are opposite in their actions; if the anterior pituitary is active, it stimulates the post. pituitary; if the anterior increases too much, then it begins to diminish the activity of the posterior; if the posterior begins to increase too much, it diminishes the activity of the anterior.

Take the element of curettage. Why will a woman, if curetted too thoroughly, cease menstruation? Especially before menstruation the endometrium gives out a secretion which stimulates the ovaries. Within three days of menstruation the decidua gets still thicker and further stimulates the ovary; but if you curette the endometrium entirely away the ovary, missing the stimulation, may stop its normal function or the corpus luteum may not regress, and you may have a difficult task to get the menstruation back.

Now, about prescribing ovarian extract for this patient. Ever since I began the use of ovarian extract I have prescribed the whole gland, and I have been doing that for twenty-two years; and in my earlier years I always prescribed Merck's ovarian extract,—which was imported until our own local drug houses began to make it right. France, Italy and other European countries began making these gland extracts right before we did. I don't think in my whole life I have written a prescription for corpus luteum once where I have written ovarian extract fifty times. And why not? Why have I always said that corpus luteum is not the drug or secretion for the cases for which I am giving ovarian extract? Because the true corpus luteum only develops actually where and

when the patient is pregnant. While there is a luteum change in the inner lining of the ruptured follicle this grows more after pregnancy than when there is no pregnancy, and it must be something different from the ordinary ovarian extract. Why does nature make the corpus luteum grow during pregnancy? It undoubtedly exerts a trophic influence on the endometrium, it gives the endometrium something to help restrain the trophoblast cells of which I spoke the other day.

But the next important act of the corpus luteum is that it inhibits ovulation; in other words, nature does not want the ovaries to ovulate during pregnancy. It is waste of eggs in the first place, and starts that stimulation to menstruation which nature does not want; and so the C. L. must have an action totally opposite to that of the ordinary ovarian secretion. I have given C. L. to inhibit menstruation; I have given it for menorrhagia. Corpus luteum stimulates the thyroid before each menstruation and during menstruation and in pregnancy, especially, is supposed to inhibit the posterior pituitary.

Now you have your cystic ovary, and your corpus luteum rests, and your cystic ovary and your corpus luteum cysts are something you don't find in a man. You may say he has the cells of Leydig; you may say he has his adrenals; but he has not the corpus luteum, and the only two things he has not that the woman has are the corpus luteum and the placenta. Therefore, if you follow this thing out with an eye to logic you will see that only two things can be responsible, the corpus luteum and the placenta. But thousands of women have hyperthyroidism without being pregnant. Put your finger on the corpus luteum. It is the corpus luteum that gives the woman the tendency to hyperthyroidism; and it is the retained corpus luteum in the child that may cause is to be nervous, for the ovaries are working in the little girl of five to nine years of age; and if you watch your little girl, or your patient's little girl, you will find in many a child, just as you find in the adult woman, the cyclic premenstrual phenomena if you look for them. A little girl will go along perfectly well, normal and happy and jolly; then for three or four days will have sleep-

less nights, will be excitable, incorrigible, etc., and the parents discipline the child. Then again the child is perfectly normal for another twenty odd days, and then comes another period of irritability, etc. Has it ever entered into the minds of the parents to realize that that comes along every four weeks? No. Have we ever told them that it does? No, for we have never thought of it ourselves. Just as often as you find the premenstrual phenomena in the adult woman, just so often may you find them in the little girl if you look for them. Hence many of us have been unjust and impatient with such little girls.

You know how follicles break, how follicles fill with blood and regress. In most ovaries at operation you see one or two corpus luteus rests remaining; then you also see many unbroken cysts. For years I have operated on certain sterility cases by laparotomy, removing from the ovaries cysts and corpora lutea, etc., for so long as they are there many a patient will not ovulate, and so long as corpora lutea are there they are hurting her thyroid and making it sensitive.

Now, of all the things on which I have laid stress for years, one of the most important is this: When you take a patient's history, ask her as much as you like about how old she was when she commenced to menstruate, how menstruation came on, etc., ask her what you like, but be sure to ask her this one small question: "How many days before you menstruate can you tell that you are going to be unwell?" It is the simplest question to ask, but there is not a key that opens to you as much knowledge of the patient's state as that. If she says that she does not know until the blood comes,—write on your chart: "Good endocrines," and write it in red ink. If she tells you that a week before such menstruation her breasts become full and she has a little pain,—that is something. But if she says that a week before her menstruation she is excitable, restless, "crazy"; that she slaps her children, though she does not at other times; that she quarrels with her husband, which she does not at other times,—then write on your card that something is wrong with some of the endocrines.

Could you ask for anything more clear? That is why in gynecology we have gone on to this endocrine treatment, because we have the symptoms that many doctors do not ask for,—and I am afraid that many gynecologists do not. That is the time to find out which of the glands are at fault in producing the symptoms. The one that is frequently at fault,—not alone,—is the thyroid. You will have patients who are hypothyroid at all other times,—will have cold hands, dry fingers, dry skin; are tired mentally, languid,—all the signs of hypothyrodiism, who five or seven days before menstruation show hyperthyroidism. Some have a hyperadrenalism before each menstruation; some a hyperpituitarism, etc. So there is not a play or juggle of the endocrines in one patient that you don't find the like or a different one in another.

And you will find the same things in the girl at her entrance into the menstrual life at thirteen to fifteen. You will find palpitations, tachycardia, excitability, nervousness, etc., etc. Some girls have to be taken out of school. It is hyperthyroidism, or hyperadrenalism or hyperpituitarism. I don't think it is hyperthyroidism alone. If you have a bad combination, you have a fearful, nervous, frightened sort of person, whether it is a child, or a girl of the adolescent age, or one going to get married, or a woman at the change of life. Think what you can do with them! And while I am telling you about hyperthyroidism, think of every patient from the standpoint of the ten or fourteen glands in the body. Don't give all conditions a name. Why should you call it hyperthyroidism, until you are sure it is that only; it may be alternately hyper or hypothyroidism; it may be hyper or hypopituitarism,—anterior or posterior. Forget the name of the disease and put down on your chart the glands which are hyper or hypo. As I said to you the other day, I believe in the future history cards will be written like music sheets,—above the heavy line of normality are to be written the glands which are plus, and below the lines the glands which are minus. Then, instead of being introduced to Mrs. So and So, you will show me a card, and I will say: Ovaries, interstitial, normal; ovaries, follicular ap-

paratus, hyper; adrenal cortex minus; adrenal medulla minus; or pituitary,—posterior or anterior,—plus or minus, etc.,—and I can almost tell you what she looks like, how she acts,—if what you showed me is correct,—and can tell you how to treat her.

So with children. They do go through their premenstrual cyclic phenomena long before they menstruate, and it is a very important thought. A like thought applies as well to boys as to girls, but to girls particularly.

Then when you come to the change of life period, the glands are going back to the same stage or condition as before menstruation was established; and as the girl entered the active glandular period and thereafter was or was not affected by the various inter-current conditions,—such as infectious diseases, pregnancy, labor, etc., etc., so the patient goes out of the stage of glandular activity with relatively the same degree of hyper or hypo, or normal conditions with which she entered into it. That is why the family history is so important; in some families they all start to menstruate late; in others, all start early, etc. Some families never have any upsets; others show a history of frequent upsets. What do psychological and psychic changes mean at the menopause age? Nothing more than a psychic upset, as at any other period. Remember, all psychic upsets are the result of endocrine activity unless produced by trauma, or tuberculosis, or syphilis, etc.,—and there is not one of you sitting here that does not possess a certain amount of instinct or emotion which, if exaggerated sufficiently, would constitute a psychosis. The very interest, positiveness, and enthusiasm with which I am talking to you might be, if exaggerated enough and without proper cerebration and control, a very severe psychosis. That is all there is to any psychosis. It is an exaggeration of an emotion,—the exaggeration of fear, or of the sex idea which may be the dominating thought and talk of patients with psychosis. The instinct of being with other people, gregariousness, and of being afraid of being alone, if exaggerated is a form of psychosis. The idea of wanting to be alone and away from others

may be hugely exaggerated. The difference between a recluse and a person in a sanatorium is simply one of degree; the difference between a high grade moron and a feebleminded person is only one of degree.

So that a study of the climacteric period, with the readjustment of the endocrines of a patient who is thirty years older than when she began to menstruate and with a resistance therefore less than before, because of all the intercurrent changes produced by intercurrent physical and pathological processes, is full of interest and value; but the period during which a girl goes into the menstrual cycle is just as dangerous for her, for that is the period at which dementia precox develops, and perhaps five years from now we will have no more dementia percox, for we will have learned to recognize the early threat and treat these cases long before they develop the symptoms. Last year in the *Journal of the American Medical Association* was a report from one of the hospitals in Boston of 100 cases of psychosis, that had been admitted within a few days or weeks after an attack of influenza,—some of the cases having had pneumonia, others not. Among these were 50 or 60 cases of dementia precox and manic depressive, etc. Would any one mean to tell me that those cases were due only to the influenza bacillus and toxins acting directly on the cerebrum? No, the toxins affected the glands in the latent cases and rushed them on the explosion of the psychosis. And what is the sleeping sickness or encephalitis lethargica? You may have as much injury in the cerebral cells as you like, but a basic element is the pituitary gland that is affected so that the patient may go into hibernation.

Just the same when you go to sleep. Your glands go to sleep; but if your glands do not go to sleep you have dreams or wakefulness, and your dreams or your waking thoughts are governed by the gland or glands that are over-excited; and the glands that give the most trouble are the thyroid and adrenals and pituitary. If you read or drink coffee, and stimulate your thyroid and the pituitary, then you may lie awake for hours, and you cannot sleep, for your thyroid is not asleep; and if

you get in a terrible fit of anger before you go to bed, and your adrenal gland is especially active or stimulated, you cannot go to sleep, your adrenal endocrine is stimulating the brain. So what you think when you are awake and trying to sleep is an important indication for the doctor. If it is a dream of making a speech or doing something philosophical, that is governed by your anterior pituitary lobe; if you are dreaming because of adrenal cortex activity, you are doing something pugnacious; if your adrenal medulla is overstimulated, you are having dreams of fears; if it is a sex gland that is causing the stimulation or keeping you awake, then you are dreaming or thinking along those lines. Take a pencil and make a big mark around the word Freud. Avoid the application of the Freudian doctrines. If anything in medicine has brought disquiet to the doctors and unhappiness to the patient, it is the Freudian doctrine. The individual who thinks certain thoughts in the day time and who dreams of them when he is asleep is often no more responsible for the type of his dream than I am for what the weather will be tomorrow.

Post-Graduate Hospital

December 16, 1919

This patient is 41 years old. She has had five children, the last six years ago. She has had three miscarriages, 5, 4, and 2 years ago. The last one was at the 5th month. Her menstruation has been irregular for the last few months, coming every three to eight weeks. She complains of pelvic pain, has had headaches and dizziness, and attacks of palpitation.

It is for us to determine whether this patient has a local condition responsible for the pain and what relation, if any, the local pelvic condition has to her general state.

Looking at the history, especially in view of her menstruation which has been irregular,—sometimes every three and sometimes every eight weeks,—it looks very much as if she were ready to enter into the so-called change of life,—the climacterium. However, we are here confronted with the problem of reflex influence,—the old bugbear of gynecology,

that trend in our specialty which has done so much harm; the inclination to say that anything wrong in the pelvis is by reflex action responsible for everything of which the patient complains.

In many of these cases you find the uterus enlarged and displaced,—retroflexed or retroverted, which are not the normal positions; yet while they have very much to do with the patient's general state,—while they may influence her general health very much,—it is not right for us to say that reflex influence explains everything. Patients at this stage may have various gastric disturbances; they are likely to have gallstones, or peptic or duodenal ulcers; if they suffer from headaches that may be due to a condition depending on congestion; it may be dependent on a renal condition, or on the endocrines.

This patient talks very much as if she had a pharyngeal irritation. We know enough about the invasion of the sinuses to know that many an intractable headache may be dependent on that state and have nothing to do with the metabolism of the body in general. So it is an old hobby of mine, and I have been more and more confirmed in my opinion as I grow older, that it is a very serious mistake to refer to reflex channels many symptoms and conditions supposedly produced by alterations and changes in the pelvic tract.

Our problem here is to determine whether what we find on pelvic examination explains the symptoms for which she comes to us, or whether we are to be guided in our diagnosis of the symptoms by the fact that she appears to be ready to enter the climacteric state.

(Examining.) You see she makes more fuss about the left than the right side. We find a cervix that is badly lacerated on both sides, a uterus that is decidedly retroverted and almost retroflexed, and which is enlarged. The enlargement of the uterus need not surprise us for the patient has had three miscarriages in the last five years. After miscarriages we frequently find a subinvolution persisting, because the simple emptying of the uterus of its own accord or cleaning of the uterus by curettage does not constitute all that should be

done to bring the uterus lack by normal involution to its normal size. Therefore after miscarriages, whether a curettage is done or not, the patient should be given for a long period of time some of the ergot or mammary extract preparations until the uterus is of the normal size; and now that we know the value of mammary extract, we find it is often better than the ergot preparations for bringing about a normal involution.

That is simply repeating what I have said so many times. If nature produces involution by the aid of nursing; and if nursing brings about involution by the extract of the mammary gland, why should not we use the same drug when we want to produce involution? So there is no objection to giving both ergot and mammary extract; for instance, you may give ergotin gr. 1-2 and 7 grains of mammary extract in a capsule; and give these two drugs three times a day for many weeks. (Instructs Dr. Tai in making examination with speculum.) Now we will paint the cervix with 3½ per cent. tincture of iodine. On using the sound we find that the uterus is nearly an inch longer than normal, and the sound shows the position to be retroversion with a tendency to retroflexion,—and an enlarged uterus.

Now I will ask you what has the retroversio-flexio and what has the laceration of the cervix to do with this patient's general symptoms? What is the relationship? Are her headaches and the dizziness of which she complains, the palpitation and the irregularity of the menstruation to be explained by the laceration of the cervix? You will find that in past years, and even today, there is a persistent notion in the minds of hundreds of practitioners that a lacerated cervix by reflex is responsible for any number of annoyances from the top of the head to the soles of the feet. They thus explain headaches, dizziness, nausea, vomiting, indigestion, tachycardia, sleeplessness,—all the annoyances that are included in what I consider symptoms peculiar to the climacterium.

So far as this erroneous teaching goes, in this patient there is no relation whatever between the laceration of the cervix and any of the symptoms mentioned. How about the

retroversio-flexio? Outside of the local annoyances due to the displacement, the malposition has nothing to do with the symptoms enumerated in this patient's history. With retroversio-flexio, there is a displacement of the ovaries, and with ovaries displaced in that way, or with ovaries whose circulation is interfered with, or with ovaries altered in their character by inflammation or altered as to their secretory character by cystic changes, you may have annoying constitutional symptoms,—not because there is a reflex, but because the secretory activity of the ovaries is interfered with and may interfere with the normal activity of other endocrines on whose normal function health depends.

Here is a patient who is menstruating irregularly,—every three to eight weeks,—and it is for us to determine whether she is or is not ready to go into the so-called climacterium, though menopause may not occur for six months or even years from now. This wavering between periods of normal action of uterus and ovaries and the period when their activities cease may extend over years of time; and during that period of time the patient's endocrine alteration may be gradually going on, or gradually adapting itself to what is going to be the final relation when menstruation eventually ceases. We know that among the symptoms of the climacterium are attacks of dizziness, palpitation, periods of prolonged sleeplessness, possibly headaches. Then there are variations in the patient's metabolism, in the patient's mental attitude; the psychic state. As I said before, all may be explained only on the basis of endocrine alterations. We have changes in the ovaries, changes in the secretion of the thyroid, of the suprarenals, in the secretions of the pituitary,—and these changes and alterations account for many or all of the symptoms.

The most frequent condition of all these is one that involves the thyroid or the pituitary. At this so-called menopause period some patients have too much thyroid, some too little; in others there are alterations between hyper and hypothyroidism. Now, if you want to do something to further your medical knowledge, get Cushing's work on the pituitary

gland. Although it is mostly surgical and although some of the views therein are not absolutely settled, the greatest value of the book will be the following of the photographs you will see of the patients,—one photograph of a patient in her or his younger days, and another of that same patient during the period when he or she is being treated for the specified disease. You will be astonished to note the changes that take place in these patients,—changes, the nature of which you will learn in the course of time to understand and value at a glance. It is the same as if I had today the photograph of every person here at the age of twenty and of every one at his or her present age. You would be astonished at the facial changes—if you looked for nothing more,—at the physical changes; and of course if we could analyze these properly we might be amazed at the psychic and mental changes. It is well enough to believe that the air we breathe and the food we eat affects us. The lives we lead affect our psychic attitude, etc., but after all these things do not cause a change in bony framework, nor a change in the shape of the jaw nor the size of the hands. These are just as remarkable or worthy of remark as the growth attained at 21 or 22, when adolescents reach the adult stage, compared with the state of the child at three or four. The two most noticeable changes that you will observe in these pictures are the changes effected mostly by pituitary alterations and those that are due to the thyroid and adrenals. The thyroid changes will not be so marked physically,—I mean stature and the bony growth of the face will not be altered; but there may be a typical appearance of exophthalmic goitre. The exophthalmos attracts your attention, but the other alterations due to the pituitary are the most noticeable; and you will readily understand some of these when you remember how the acromegalic patient looks. There are thousands of persons with such changes that are not gross enough to be called acromegalic but can be detected by those who are alert; and when you know that these physical changes are affected by a certain lobe of the pituitary gland (the anterior lobe) you must believe that these glands may affect the patient's mental

and psychic attitude also. That is why I say that during this change of life period, when the physical evidences are sometimes pronounced, it is easy to make a diagnosis; but when they are not so pronounced, it is not at all so easy.

The results of this patient's examination are: dislocation of the uterus and dislocation of both ovaries, with probably some inflammation in the region of the adnexa. If her pelvic pain is sufficient to give her grave concern and to interfere with her duties, I think she would be much benefited by an operation; but whether she is operated upon or not we ought to do something for her general state; and inasmuch as I think she has an excess of thyroid gland,—has hyperthyroidism,—what are we going to do for her? (Ans. Give her ovarian extract?)

While her menstruation is irregular and her uterus is enlarged, the most pronounced characteristic of her menstruation is that she goes three to four weeks over her period, and her uterus is enlarged. Would you give her thyroid? No, for she has already a hyperthyroidism.

Ans. Give her mammary extract.

Why?

To reduce the cervix and uterus.

Very good. Give her ovarian extract? Yes; why not give her ovarian extract? One of the fundamental changes here is the gradual diminution of the function of the ovaries. Then why not give ovarian extract for the constitutional effect, if not for any other reason? The ovarian extract will make her menstruate regularly. If you fear it will make her menstruate too much, you have already decided to give her mammary; so if you give mammary extract plus ovarian extract you will overcome any tendency that may result in the direction of too much bleeding. Is that right?

Would you give her suprarenal extract? Yes; unless her blood pressure is very high, and on general principles, even then, there is no very great objection to giving a little suprarenal extract,—not adrenalin.

Would you give her pituitary extract? No one of you seems to know of any reason for giving it. I don't know of any particular reason why she should get it. We are not desirous of stimulating bony growth by the anterior lobe of the pituitary; the posterior would stimulate menstruation, but she has too much posterior pituitary now. If we gave either, it would be the anterior. With the combination,—ovarian, mammary, and possibly some suprarenal, we will write.

5 grains of ovarian extract
5 grains of mammary extract
1 or 2 grains of supra-renal

in a capsule and give that three times a day.

In addition to that, if the patient is highly nervous, hypersensitive, or sleepless, bromides would do a great deal of good. There are some patients who suffer from intractable headaches. The source of some headaches is referred to the pituitary gland, that is a dyspituitarism,—in many cases an enlarged gland which stretches its covering to such an extent that the headache is severe and intractable. Yet we are advised to give pituitary extract for these cases, and in many instances they are said to improve on pituitary extract,—whole gland,—2 or 3 times a day,—so that the administration of pituitary gland in any patient, granting that we find such an anomaly, may be held in reserve for further consideration. The headaches due to posterior pituitary overactivity are often relieved by placental extract. The headaches are due to inincreased tension in the cerebrospinal canal. The one thing that this patient needs most, apparently, is the extract of ovary, whole gland, not corpus luteum.

On what do you make the diagnosis of hyperthyroidism? She has a very decided palpitation and a tremor of the hands.

How long shall we give the ovarian extract? For some months.

Locally, she should have hot douches of any drug you like,—boric acid, iodine, aluminum acetate, etc.

The point of discussing this case so extensively is that she came to the clinic complaining of various symptoms, and

that the laceration of the cervix and the retroflection which we find are not responsible for her general symptoms by reflex. That is the point.

One point more. I wish to call your attention to the fact that this patient has had three miscarriages, after she had had five children. I think it would be very unwise to conclude that the laceration of the cervix or the retroflexion version was responsible for the miscarriages. In the examination which the Doctor made with the sound we found little change in the lining, and the history does not speak for endometrium; so I think the evidence adduced by the three miscarriages points directly to an endocrine aberration. In just these few sentences I can tell you that I believe many very early miscarriages may be due to an overgrown endometrium. The egg settles in a bad spot. Many miscarriages are probably due to poor localization of the ovum,—that is localization in the lower area of the uterus where, if the egg were not aborted, a placenta praevia might develop. A few miscarriages and abortions are due to a syphilitic state, but the largest number of habitual miscarriages are due to endocrine aberration; excess of the posterior pituitary, so that today, in speaking of repeated miscarriages, the Wassermann reaction plays nothing like so important a rôle as it did a few years ago.

Case II. This patient is 29 years of age; she has been married eight years, and comes to us complaining of pain in both hypochondriac regions, down the back, and in the pelvis. One year ago she had a curettage after a miscarriage. She has two children, apparently normal,—seven and five years of age. There is very little in the history. Her menstruation lasts a few days.

Has she pain after eating? Yes. Has she any pain in her legs? Yes.

Do you know of the surest way to find out whether a patient whom you suspect of having hyperthyroidism has hyperthyroidism? Supposing you have a patient and you think she is suffering from hyperthyroidism; how can you prove to yourself that it is so? Ans. Give her thyroid extract.

Of course. The administration of thyroid is one of the most valuable therapeutic diagnostic procedures that we have. If a patient complains of tachycardia, and you want to know if she has hyperthyroidism, give her thyroid for two or three weeks. If she has hyperthyroidism, it will get worse, of course. Don't imagine every hyperthyroidism means exophthalmos or goitre,—or persistent tachycardia or persistent tremor. It delights me when I now read in various journals about hyperthyroidism, and they say the gland is not enlarged. The gland is not enlarged in thousands of cases where there is hyperthyroidism. The gland may oversecrete even when it is not enlarged, and it may undersecrete and not be diminished in size; and it can be diminished in size and still not undersecrete. In operating you remove a part of the gland and the rest still does its work, and it can overwork when it is not enlarged. So in many a case you have to make your diagnosis by other signs than enlargement of the gland.

The same plan of diagnosis may be followed in a patient who is two or three weeks over time and you don't know whether or not she is pregnant. If you give her ovary and thyroid and she does not menstruate, you generally prove by this therapeutic procedure that she is pregnant; otherwise the combination of ovarian and thyroid would make the patient menstruate again; and it is not a bad combination to give, for it does not produce a miscarriage as do many things that are given for diagnostic reasons.

We find in this patient a small cervix, a uterus in fairly normal position; adnexa fairly normal,—possibly the ovary is a little enlarged.

A Doctor. I don't find very much trouble.

Well, you are warm. What shall we do with her?

Ans. Send her to another department.

Dr. Bandler. That is right. I purposely have not said anything that might influence you in your diagnosis. Why? If she has gallstones, it is not due to this pelvic condition. If she has a distended stomach or an ulcer, it is not due to the

pelvic condition. In other words, she is not a gynaecological case. Is that so?

Ans. I don't find anything.

No. There is not anything down below to be made responsible for the symptoms of which she complains. Therefore, as this is a gynaecological clinic, we will send her back to the department that referred her here.

POST-GRADUATE HOSPITAL

December 5, 1919

CASE I. This patient is 24 years old, and comes complaining chiefly of backache, and leucorrhoeal discharge; pain in the lower abdomen for years, which is worse after menses. She has had no children, but has had two miscarriages, one two years ago, the other sixteen months ago. She had a curettage following the first miscarriage. Her menstrual history began at 18; menses moderate, with blood clots, but no pain.

The complaint is chiefly of pain in the lower abdomen. The patient has had no children, but had two miscarriages—the first time at two months and was curetted; then became pregnant again and carried for six months. Although she miscarried twice, this comes under the head of what might be termed one-child sterility. Such a patient has a baby and does not become pregnant a second time; or has a miscarriage and does not conceive again. From the history, it seems that something took place with the second miscarriage which has prevented subsequent conception. She menstruates every four weeks for three days. (Was ten days in the hospital after the second miscarriage.)

When a patient conceives once and finds difficulty in conceiving a second time, you may presume that something has taken place either in the normal physiological processes or that a new and acquired condition has come on. That acquired condition is frequently a mild inflammation. You can understand that after a labor, with forceps, or lack of proper care, etc., a mild inflammation may involve the tubes and ovaries. That same involvement may occur after a miscarriage, with

or without a curettage. If we can remove from the field of probability an infection or inflammation, then we are dealing simply with some physiological change, the most frequent of which is one which involve the tubes and ovaries.

Here is a patient with a uterus in anteflexion but retrodisplaced. You can gather the distinction between the two. She holds the rectus very rigid as I examine bimanually, and I can feel the ovary of that side very enlarged and cystic. The right adnexa are apparently normal to the touch, and the patient shows no pain. So, to repeat, she has a retrodisplacement of the uterus, the uterus, however, being very movable; she is sensitive and very rigid on the left side, and we feel a prolapsed movable ovary which is distinctly cystic to the touch.

A retroversion or a retroflexion constitute what is accurately described as a retrodeviation, that is a backward deviation of the fundus from the normal anteflexed position; whereas retrodisplacement means that the entire uterus,—cervix, fundus, etc.,—is displaced backward toward the hollow of the sacrum. Hence you may have a retrodisplaced uterus with the fundus anteflexed, or you may have a retrodisplacement with a retroverted fundus uteri.

If this represents the sacrum and this the symphysis, and this the normal position of the uterus,—if the fundus of the uterus deviates backward you have a retroversion; if it deviates still further you may have a retroflexion,—that is a deviation or change of position on the part of the fundus; it may be, as a result, for instance, of a lengthening of the round ligaments; but if the whole uterus is pushed back you have a retrodisplacement.

In a backward displacement of the whole uterus, usually the fundus falls back, but it may still be forward in a position called anteflexion. So retrodisplacement is a change of position of the whole uterus, with the cervix as the most important point displaced; for after all, it is the position of the cervix which determines, in most cases, the position of the fundus. If the cervix is high up and far back, the fundus will naturally

fall forward; if the cervix is displaced downward and forward, the fundus will naturally fall backward. Do you see that?

This fundus is extremely movable; on the right side I don't feel anything; on the left side is a prolapsed ovary. Now we will introduce a speculum and examine the cervix. The purpose of this vaginal examination is to look at the cervix for evidences of a possible infection or inflammation. You see a slight eversion of the lips of the cervix, which in parous women is natural, the patient having been delivered of a foetus six months old. You see no redness, no discharge of a purulent nature, and no mucus from the cervix. So far as this relatively superficial examination is concerned we see nothing in the cervix that is definite proof of the existence of an inflammation. However, that is no proof that there is no inflammation, for only the other day we showed a patient suffering, subsequent to marriage, from pain in the pelvis, leucorrhoea and menorrhagia; and I stated then that when a patient subsequent to marriage acquires a pain different from what she has had before, or acquires a leucorrhoeal discharge which is not a hypersecretion, and acquires a menorrhagia,—those three points taken together suggest an inflammation; and in that patient some weeks ago the diplococci of Neisser were found, and yet outside of the erosion of the cervix there was no other external evidence of any inflammation; but I did find then sensitive ovaries that were cystic.

This patient's left ovary is sensitive and movable, yet there may be some adhesions. It is a frequent experience to operate and find tubes with the ends closed and yet not enlarged. In other words, we are accustomed to think of a salpingitis as an enlarged tube with a retained secretion. It does not have to be that way. There may have been a mild inflammation and the outer ends of the fimbriated extremity are closed, but no further inflammation takes place and the tubes are not palpable,—hardly larger than normal. If the outer ends are closed, they may likewise be bound down by cobweb adhesions which are enough to be responsible for either pain or sterility.

This patient has pain and backache. We may consider the backache as due possibly in some degree to this retrodisplacement. Most of these cases are due to a chronic cervical catarrh, eventually ending in retraction of the utero-sacral ligaments. We find, with the eye and our fingers, evidences of inflammation. The condition suggests, with a chronic cervical irritation, a possibility of the tubes being closed without our feeling it; or possibly cobweb adhesions which cannot be felt.

Granting, however, that this patient has no cobweb adhesions, or that she has no closed tubes, why is it that having conceived twice she is sterile now? You must realize that every miscarriage and every premature labor renders the possibility of a subsequent pregnancy less probable. It does not by any means make it impossible, for you know dozens of cases of patients who have miscarried two to six times and still continue to become pregnant; but, on the other hand, many cases miscarry only once and never again conceive. Can you explain that by any condition other than inflammation?

Yes, the only explanation you can give is that such cases do not ovulate, and by that we do not mean that there is no development of the ovum in the Graafian follicle. We mean that the expulsion of the ovum does not take place because the ripe follicle does not break. As a result, in many of these cases, there occur cystic changes in one or both ovaries which result in the failure of subsequent Graafian follicles to ripen and throw out their ovum. Therefore, when you are in doubt,—and in one-child sterility it is not necessary, as a rule, to examine spermatozoa,—your therapy is directed mainly to promoting ovulation.

This patient should be given douches as a general proposition, and the best is either boracic acid or aluminum acetate; and in addition you will give her a prescription of some of the endocrines, with the idea of promoting the bursting of the follicles. I am sure I do not need to give you any information in regard to that for you all know about it. We will give this patient both ovarian secretion,—the whole gland,—and thyroid, in capsule form, three times a day,—grain v-x of the

whole ovary and 1/10 or 1/6 of the **thyroid gland**. In that combination we have the best agency for stimulating ovulation.

Case II. This patient is 48 years old; she has been married twenty-five years and has had five children, the youngest ten years old. She has nursed all her babies. She has had two miscarriages, the last 11 years ago. Her menstrual history began at 15, moderate and regular. She had her last period a year ago. She complains chiefly of pain in the abdomen, burning on urination, and a leucorrhoeal discharge, yellowish white in character; also frequency of urination,—every hour,—accompanied by pain. She has had flushes, but not now. She has lost in weight.

Here is a woman forty-eight years of age with amenorrhoea of a year (her last menstruation was a year ago), who has suffered since then with relatively few if any flushes or flashes, and very few of the various phenomena associated with the climacteric period. Many women go through this change of life period as they go through their adolescent developmental period, without any phenomena at all. Sometimes the menstruation grows gradually less from month to month and runs a diminishing course until it disappears; in other cases there will be a period of amenorrhoea for two or three months, and then the menstruation may be restored for a long time. In many cases it ceases at once and never recurs; but as a rule there is an interchange between amenorrhoea and menstruation for varying periods. Women are supposed to expect menorrhagia and metrorrhagia as the usual course. That is not correct. Any patient who suffers from regular excessive or irregular and excessive menstruation has something abnormal accompanying the change. This notion on the part of the laity and among many doctors prevents many patients from seeking advice early enough to prevent increase in size of fibroids or to recognize early carcinoma. Diminishing menstruation is the typical accompaniment of the menopause, not excessive menstruation.

In addition to constitutional symptoms, in some patients the flushes and flashes are terrific; many suffer from excessive

nervous upsets,—sometimes of the excitable type, sometimes of the depressed type. During this change of life period psychoses are prone to develop. It would be wrong, however, to say that the change of life period produces psychoses; and it would be wrong to say that cessation of menstruation causes them. It simply means that at this climacteric period, when the endocrines are rearranging themselves on a new basis, patients may suffer from a temporary hypo or hyperthyroidism, or a temporary hypo or hyperpituitarism, or a hypo or hyperadrenalism. During this period of readjustment a latent tendency to a psychosis may develop further, since it is brought out by these varying adjustments of the glands. Of them all, you will probably find the depressed stages, simulating the myxoedematous type, the more frequent. Again, you will find the type where patients will alternate between the depressed and the excitable, which in many instances means a hyper or hypothyroidism, a hyper or hypopituitarism, a hypo or hyperadrenalism, etc.; and in this stage there is a tendency to glycosuria and a great tendency to high blood pressure. All of that, theoretically and by the test of therapy, can be referred to changes in the various endocrines, especially the posterior pituitary.

Now, then, what evidence have we as to what local changes are occurring in this menopause. The first is the trophic change, which means a diminution in the size of the uterus, an atrophy of the uterus. That is the first. The next is the diminution in the trophic care of the external genitalia, the vagina, etc., of women at the change of life period, or after the change of life period. They are very susceptible to vaginitis, the most typical of which is called senile vaginitis. They are very susceptible to pruritus vulvae. Occasionally this is on a diabetic basis, but aside from this the vulva is frequently the site of pruritus and irritation. Then comes the most extreme type of external change, of atrophy,—the blanching of the mucous membrane and the skin, a drying up and drawing together or sclerosis, so that the entrance to the vagina is narrowed so that one finger can scarcely enter. This is known as

kraurosis vulvae. All of these changes are due to lack of proper care and control by the internal secretions that preside over the nutrition of the entire genital tract; and the disappearance of that control makes the external genitalia susceptible to infections, etc. This patient complained of frequency of urination. Burning on urination is not truly a part of a diabetic condition. The first thing in these cases is to exclude diabetes, which is easy. You will have in many diabetic patients an appearance of the vulva that is almost typical and characteristic. If I were looking at the vulva of this patient, without any notion of her history, the first thing I would suggest would be to see and to examine the urine, for while the vulva is by no means typical it is suggestive of diabetic vulvitis,—the skin and vulva being a shiny darkish red and leathery in appearance.

Then you have other cases of diabetic vulvitis with irritation and itching but without a sign of change of color. (Assistant tests urine: This patient is diabetic. There you have it.) While that is not as typical as in some cases, it is,—as you now know, a genuine diabetic vulvitis. She knows now that for five years she has been a diabetic (she just now volunteers the information). So we have here the explanation of her frequency of urination, and an explanation of the external irritation, and an explanation of the appearance of the vulva.

So we have diabetic patients that complain of pruritus vulvae,—some that complain of no such manifestations,—but don't imagine that pruritus vulvae is always evidence of a diabetes. By no means. Just as men may have furuncles, etc., on the back of the neck, women may have a follicular disturbance here. The best thing we can do for such non-diabetic cases is to innoculate them with vaccines. That helps most cases of recurrent furuncles. Many persons are potential diabetics for years. We know that as woman approaches the change of life period the alterations of the endocrine glands bring out this tendency or develop it; and you know that the later in life the patient develops it the less danger it is to the prolongation of life. A man or woman becoming diabetic at

45 or 50 may still live twenty or thirty years, but a child acquiring diabetes has an almost fatal condition.

We know very little except in a very general way about the various forms of diabetes. There are various forms aside from the pancreatic and renal. We know there are glycosurias that do not constitute diabetes which are related to the thyroid adrenals or pituitary, and these interest us most, for the thyroid and pituitary play an important part in the functions of the female as they concern the gynaecologist and obstetrician. Many of my pregnant patients have a transient glycosuria which disappears, and I have considered most of them as pituitary in nature.

I have a patient upstairs who was pregnant nearly seven months. Her physician examined her and found that she complained of persistent headaches and defective vision and he found a blood pressure of 190. He examined her urine and found albumin, and sent her to me. I tried to carry her along for two weeks or a month, and gave her Murphy drip, etc. Her blood pressure remained at 190, the hyaline and granular casts increased, her vision began to grow progressively bad. Whereas in the morning she could see the flowers on her stand, she could only see a haze in the afternoon, and in the evening she developed an eclamptic attack. She was treated with 1/6 or 1/4 grain of morphine every two hours. Another thing we did was to give high colonic irrigations. The next morning she went into labor, after a dose of castor oil, and was delivered of a dead fetus. Since her eclampsia she has developed an occasional glycosuria, not present before, but present since. Whether that is due to some change in the pancreas or the liver, we don't know, but since we consider pituitary plus and thyroid minus as all important factors in eclampsia it may be just as well to look to those endocrines in all our obstetric cases.

What shall we do for this patient? The treatment of these cases of vulvitis is firstly general,—as to diet; second, general as to medication, in which codein plays an important

part. But locally the patient complains of frequency of urination and of itching. For that we must give relief. If this patient takes a douche every day, aluminum acetate, a teaspoonful in 2 quarts, and if she applies externally to the vulva an ointment composed of dermatol zi to each ounce of zinc ointment, and keeps it on almost constantly,—not washing it off, but removing it occasionally with olive oil,—that will probably give her as much relief as any combination that I know of. Dust the ointment very liberally with talcum powder so that it forms a thick paste, and let that stay on all the time,—occasionally being washed off with olive oil and replaced. That with the proper diet constitutes the treatment.

It has been said that the sugar from the urine, coating the whole external genital region, forms the ground on which fungi, etc., grow and flourish, producing the dermatitis; and some persons have treated that condition by washing thoroughly with soap and water, and then with alcohol, and then bathing the parts with bichloride of mercury,—1/5,000, and so destroying the fungi or other growths responsible for the condition.

It is interesting when we study the cass of pruritus that we see to observe other neighboring annnoyances and irritations, especially such as are seated around the anus. You see then, sometimes in bad cases, that the area around the anus is furrowed like the spokes of a wheel, etc., and many of these cases are found to be due to bacteria,—hence many cases are cured by autovaccines or by mixed stock vaccines; so that we cannot deny the possibility of the association of some form of bacteria on the surface. The ideal thing would be to have a test made to see whether any bacteria are present.

The urine is clear, so we have no associated cystitis. Stock vaccines, streptococcus and staphylococcus mixed, would probably help this patient.

Placental extract is worthy of trial in glycosuria due to posterior pituitary overactivity.

Lecture at Post-Graduate Hospital

November 18, 1919

I am going to speak to you this morning on the subject of the endocrine glands, and will devote as much of the time as possible to the pituitary body. The first phase of pituitary activity that attracted the attention of gynaecologists and obstetricians was the fact that pituitrin, which is made from the posterior lobe, has a very powerful effect in labor in that it stimulates the uterus to a very great and powerful and rhythmic action. If you give pituitrin to a patient you will always get some contraction of the uterus. For example, before a Caesarian section we give a hypodermic of pituitrin so that the uterus is well contracted before we make the incision, but it does not produce the rhythmical contractions the uterus in labor demands. If, however, the patient shows by the preliminary symptoms that she is going into labor, then pituitrin will bring about the regular rhythmical action.

On the other hand, the pituitrin, so far as its specific action in trying to expel the baby is concerned, seems to act only when the patient is ready and sensitiveness is established in the patient. What establishes that sensitiveness we do not know, but pituitrin will act in specific fashion on the 280th day or thereabout and will not at any other period. When a patient is miscarrying or you are curetting a patient going through a miscarriage, pituitrin will have some effect in contracting the uterus, so that something new in the element of pregnancy has sensitized the uterus to the action of pituitrin. That gives evidence that the pituitary body,—the posterior lobe we are speaking of,—has an intimate and direct connection with the genital tract.

There is a condition which is known as dystrophia adiposogenitalis,—a condition which is probably due to an involvement of the posterior lobe more than any other part of the gland, whereby a diminution of the secretion of the posterior lobe extending over a long period is evidenced by two factors: First, interference with the carbohydrate metabolism so that

the patient increases progressively in weight and becomes fat. Associated with this condition is a progressive diminution in the loss of blood at menstruation, and that is followed by a diminution in the size of the uterus. That affects many women between the ages of 22 to 30. They grow progressively stouter and stouter, and an examination will show that the uterus has undergone a certain degree of atrophy. That is mainly due to a deficient secretion of the posterior lobe; how far the anterior lobe is involved has not been decided. If you have that picture before you as an evidence of the lack of activity of the posterior lobe, what picture would you have to show hyperactivity of the posterior lobe?

If you have a hyperactivity of the posterior lobe and there is no interference with carbohydrate metabolism the patient may not be stout. If you have an active, normal, or hyperactive lobe, menstruation ought not to diminish, the uterus ought not to atrophy,—so that you ought to have a patient not stout, a uterus not small, and a menstruation not diminishing. Therefore, if an overactivity of the posterior lobe exerts an overstimulation in a trophic way on the genitalia, what would you expect a uterus of that sort to be? Enlarged, myomatous in character, or a uterus which has within its walls a fibroma or a myoma; so the probability is that cases of fibromata and myomata, and many cases of enlarged uterus are due to an overactivity of the posterior lobe of the pituitary gland. That follows logically.

If that be the case, the hyperactivity of the posterior lobe should be evidenced, among other things, by a tendency to an increase of sugar in the urine or in the blood under a normal diet or increased carbohydrate diet, or after a test made with lactose or glucose or other sugar-producing substances.

One function of all glands is to resist an inroad made upon the system by an infection or by a strain, or by a new process going on. When a patient becomes pregnant there settles in the uterus a fecundated ovum. The first evidence of that fecundated ovum is a cessation of menstruation. That shows

that certain gland actions that normally produce menstruation are inhibited at once by the fecundated ovum. What does it?

The outer layer, the shell of this growing egg, is composed of what are known as trophoblast cells, and they develop subsequently into the placenta, and it is they, and their secretion which is thrown into the blood, which nullify or antagonize those gland elements which normally produce menstruation. As the fecundated ovum grows larger and larger, and the foetus develops, certain changes occur which are evident to every one. The thyroid gland practically always increases in size and probably in activity, because the body is doing two things: First, it is nourishing the growing embryo; and second it is defending itself against an invasion by placental elements. The suprarenal gland undergoes changes in pregnancy, and these changes are stimulated and can be stimulated only by something which the placenta produces. The anterior lobe of the pituitary body undergoes hypertrophy, the cells increase in size and show all the evidences of increased activity in pregnancy; and that lobe never returns to its previous state; some evidence of its previous hyperactivity always remains after a patient has gone through her first term. The corpus luteum, and especially the true corpus luteum, is supposed to stimulate the thyroid and to somewhat inhibit the pituitary posterior. The placental secretion inhibits the true pituitrin contractile action of the posterior lobe until full term is reached. It does this as a general rule. The trophic effect of the posterior pituitary during pregnancy is evidenced among other things by the painless contractions of Braxton-Hicks.

You have the suprarenal, the thyroid, and the anterior lobe showing an increased activity: first, to aid in the nutrition of the foetus; second, to protect the body against the invasion of these new placental elements. The same thing holds true, probably, of all the glands in the body.

What does the pituitary lobe do during pregnancy? It produces in the uterus painless rhythmical contractions, in no wise severe or continuous, and without the power of dilating the cervix, which it does at full term. It produces a certain

automassage of the uterus, so that the latter grows larger and is adapted to the growing ovum. The uterus at the same time grows larger of its own accord and hypertrophies through glandular and pituitary stimulation. If a normal uterus were similarly stretched for nine months by the growing ovum, it would be as thin as paper at full term, but as it grows, it is stimulated to hyperplasia; this automassage aids in that process, with the result that you have a greatly enlarger uterus, and also a hugely increased amount of muscle,—so that you have evidence of activity on the part of the anterior and posterior lobes acting in a trophic manner and since these phases of activity are produced by pregnancy, and since the placental element in the early months is the only additional element at that time, we give to the placental secretion part of the credit for these changes.

Does the placental extract do anything to the ovary? It produces the true corpus luteum or the true yellow body so that you have in the ovary again an evidence that a change has taken place in the character of its secretion by what the placental element has thrown into the blood.

If the posterior lobe of the pituitary is responsible for these changes (many of them) in a woman, and if labor pains are due to the posterior lobe extract,—we find no parallel of the same type in men,—therefore, whatever else you can say, you may say this: The posterior lobe of the pituitary is eminently a feminine sex gland.

Is the thyroid a female sex gland? Much more so than it is a male gland. The thyroid swells at menstruation; it increases in activity during pregnancy, and thyroid diseases are eight to ten times more frequent in the female than in the male. Therefore, the thyroid in its relations to the other glands of the female sex is extremely sensitive to changes. If goitre is eight to ten times more frequent in women than in men, the thyroid must be more sensitive; therefore its relation to the sex glands makes it probable that the act of menstruation and the presence of ovaries and the action of the corpus luteum are among the factors which make the thyroid sensitive.

If a patient menstruates every twenty-eight days and at the menstruation period has an excessive amount of uterine contractions or a dilatation of the cervix, and if at that time uterine pain in the form of dysmenorrhoea comes on, you may safely say that in that patient the posterior lobe of the pituitary is acting in an excessive manner, simulating to a slight degree its action at full term. So that whereas menstruation is a miniature labor, it is much more a miniature labor when there is dysmenorrhoea. Therefore, a dysmenorrhoea is in all probability due to the fact that at the menstrual period the posterior lobe is rendered sensitive, throws its increased activity to the uterus, and produces pain.

Take a patient pregnant three months. Suppose today to be the day she would have menstruated if she were not pregnant. The posterior pituitary lobe every twenty-eight days, even during pregnancy, becomes hyperactive; in the vast majority of cases you will note no difference, but in some cases the posterior lobe produces such contractions of the uterus that the uterus will go into labor at three months of pregnancy instead of nine months, and you will have a miscarriage; so that in many cases repeated miscarriages,—inasmuch as they occur at or about the time when the patient would have menstruated,—are another evidence of hyperactivity of the posterior lobe.

I will go back now for a moment to the anterior lobe proposition. A boy and a girl are of the same age, and develop to twelve or thirteen years. There are differences in the shape of the body of that boy and that girl. In addition to the fact that the girl has mammary glands, there is a totally different shape of her pelvis, her bony growth is less marked as a rule,—not so heavy; there is a totally different distribution of the fat over the body, and you can already see the difference in the body of the typical male and the typical female, and that difference progresses as they grow older. At thirteen or fourteen the girl begins to menstruate, but before that there is already a marked difference. What made the boy develop differently from the girl—already, before menstruation was established? What did it?

The ovaries of that girl were active and were giving off secretion years before she menstruated. The gonads of the little boy were giving off a secretion years before he reached man's estate,—and for that reason the girl develops in her fashion and the boy in his. First the ovary throws a different secretion into the body than do the gonads. But why? Because in the boy, among other things, the testicular extract (cells of Leydig) stimulates his anterior pituitary lobe more than it does the posterior. In the girl, the ovarian secretion stimulates the posterior lobe more than it stimulates the anterior; and inasmuch as the anterior lobe has to do with the bony growth among other things, his bony system is heavier and larger than that of the girl, and the shape of his pelvis is different from that of the girl.

You know what acromegaly is,—the growth of the facial bones and the growth of the hands and feet after full development has taken place; that acromegaly is due to the anterior lobe hyperactivity. A boy who at nineteen years of age is six feet or so high is a huge fellow who has had hyperactivity of the anterior pituitary lobe. These are simply mentioned as instances of excessive activity. If it is slightly more than normal in the growing boy than in the growing girl, you have your explanation of increased growth. When a man develops he has hair on his face and grows a beard,—has hair on his arms, chest, and legs. Some men are so hairy that they suggest an orang outang, and you may see a man with greatly developed forearms. That man has probably had a very active suprarenal cortex, but above all he had a very active anterior lobe. Another man has a very smooth, shiny face; he shaves only once a week, and has no hair on his arms or legs, and has a very delicate, sensitive skin,—shiny, smooth, and soft. He has not a hand like mine, which is fairly broad with a faint suggestion of acromegaly; he has long, tapering fingers like a woman. He has had no great activity on the part of the anterior lobe; he has a relatively greater activity of the posterior.

Then, when you see a woman who shows any of the

physical characteristics of the man, these are produced partly by the greater activity of the man's gland, the anterior lobe, in many cases. When you see a man with effeminate characteristics, he has the posterior pituitary the more predominant, and you see how small his hand is in many cases; you can see it at a glance, and say to yourself: this hand is more of the female type; and your mind goes back to the gland responsible for one or the other condition.

The secret of all gland study in the future is to be based on these few points that I am telling you now. As your skin develops, as your hair develops, as your bones develop, as your gastro-intestinal tract develops, all as the result of gland stimulation, so does your nervous system develop as the result of gland stimulation, and so does your mind develop as the result of gland stimulation. While I am directing your attention now to physical characteristics, evidenced by what I can see and by what I learn from menstruation, from pregnancy, from miscarriage, from dysmenorrhoea,—by the same token you have innumerable functional and mental changes in individuals just as much dependent upon gland anomalies as these; but we don't usually think of it that way. If I speak to you about how the thyroid, the ovaries, and the pituitary influence menstruation, I do so because that is my function as a teacher of gynaecology; but as general medical men we must think of all these gland activities as influencing the whole range of a person's life,—so that some day we may speak of a mental dysmenorrhoea or a mental amenorrhoea, or a mental miscarriage,—or repeated mental miscarriages. If you like, you can call one a dementia, and the othe epilepsy, and the others whatever you choose. Do you gather what I am getting at? Supposing you call migraine a cerebral dysmenorrhoea; it is just as good a name as the other; it means the same thing absolutely. The idea of the whole thing is to look over every patient from every conceivable point of view. There is not any other field of medicine which gives you the same opportunity to find out gland aberrations as does gynaecology, because you find out when a girl first menstruates, how her men-

struation continues, how often she menstruates, how long her menstruation lasts, whether it is associated with pain, etc., and then comes the all important point; how many days before she menstruates can she tell that she is going to do so? There is not a heart murmur that tells you more about the heart than does the answer to this last question tell you about a woman's endocrine makeup.

If a patient menstruates at thirteen or fourteen, menstruates regularly, has no pain, continues to menstruate regularly, does not know until she begins to menstruate that her period is due,—she has a very fine and stable relation between her endocrines. The minute any one of these things is altered or becomes abnormal, there is a hitch somewhere. So far as every other function of her body is concerned it may be perfect. Your automobile may run perfectly, and yet there is something wrong with the tire. You can fix that; but if there is something wrong with the mechanism, you cannot fix it so readily. So there may be abnormalities affecting a definite region, and nothing else; or there may be abnormalities suggesting something wrong in many glands.

Another patient may tell you that a week before menstruation she has nervous upset, is cross with her husband, may slap her children only just before menstruation; then she menstruates, and she is her normal self again,—then a week before the next menstruation comes the same state. She may menstruate too much, or normally; but if she menstruates normally and has no pain, and loses a normal amount of blood, there may still be a hitch somewhere, and it shows itself in these premenstrual phenomena. They are in most cases temporary, transient, premenstrual,—hyperthyroidism or hyperpituitarism, but you may have a hypothyroidism in other cases.

If you can have these changes occurring a week before menstruation,—which changes are sometimes on the border line of mental disease,—and if these changes are due to an alteration in the glands brought about by the premenstrual stimulation, what prevents a patient from having them for 365

days in the year,—not brought out every twenty-eight days by premenstrual conditions,—but a change so permanent that it is there all the time? Do you get what I mean? Therefore that patient is for 365 days of the year,—irrespective of her menstruation,—on the border line, she is psychopathic. I mention these things that you may gradually transfer your thoughts to other phases of abnormality and prove that they are due to gland development.

Therapeutically we come now to one, or two, or three of the elements that help us in our cases of pituitary anomaly. How would you treat medically a fibromyoma of the uterus before you operate, or one on which you cannot operate or where the patient will not let you operate? Five or six months ago the wife of a physician came to my office with her husband, who said that his wife had had a fibroid for several years, that it was growing larger and was giving her a great deal of pain. She had a fibromyomatous uterus containing five or six separate fibroids, reaching to the umbilicus,—reaching way over to the pelvic brim, so that I could not get my fingers between it and the pelvis. We could not operate upon her because she had for many years a cardiac lesion, and at times had to go to bed for a month or so. Accordingly I told her husband that we would go ahead and treat her medically. So I gave her a capsule containing two drugs, and you know what one of them was,—mammary extract. You know what that does. Many patients have a pain and a contraction of the uterus every time the child suckles the breast. That result of suckling at the breast is not entirely a matter of reflex. There is a secretion of the gland itself which has a tendency to contract the uterus, and a woman who is nursing her baby four weeks only, will in nine cases out of ten have her uterus back to normal size inside of that time. That action of mammary extract is more marked in myomata than in fibromata.

Then we gave her an extract from the pituitary gland. What part did I give her?

Ans. Posterior.

No. The posterior lobe stimulates; that pituitary lobe

makes the uterus grow, and was probably the cause of the myomata and possibly of the fibromata. I have shown you that the posterior lobe is more of a female than a male gland; the anterior lobe more of a male than a female gland; in that respect they are opposite in their activities, and probably antagonistic, I gave her anterior lobe. There are no fibroids in the male, but prostative enlargements are the same thing; so we gave her seven grains of mammary extract, and a grain or two of the anterior lobe of the pituitary,—and after six months there was not a nodule in that uterus as large as my fist. That is not only one experience; I have had many such.

I am not telling you to treat all your fibroids as I did that case. I am not beginning to say that it is as good as a hysterectomy. I am telling you what gland extracts will do, and you can use them in cases where you don't want to operate,—where the patient will not let you operate, and where you can't operate; and if you give these medicines for three or four months you may often have a uterus one-third as large as it was, even in that short time.

We have not yet definitely come to a conclusion,—but as the result of that theory, and as the result of the practice of that theory, I myself have come to the conclusion that so far as the genital tract is concerned, the anterior and posterior lobes have totally different actions in the female; so that when I give mammary extract for this purpose (in myomata) I often add the anterior lobe. And don't forget in this connection that the anterior lobe is a wonderful stimulant.

When a man at college is the strong man of his college and can throw a heavy weight, and can stand more than any of the other thousand or three thousand students, he has very well developed active suprarenals and has a good active thyroid, and he has a very good anterior lobe of the pituitary. That is a valuable cue, so that in cases of asthenia, where patients are tired and languid, and have low blood pressure, you can often help them a great deal by giving suprarenal extract and the anterior lobe of the pituitary,—always, how-

ever, bearing in mind what the latter may do to the menstruation since it antagonizes the posterior lobe.

Patients have come to me suffering from menorrhagia, bleeding every twenty-eight days for eight days, and I have given them the mammary and anterior pituitary extracts, and have had them go three months without menstruating, and have then had to give them medicine to bring on a menstruation. This does not act the same way on all patients,—some of these endocrine extracts do. A patient with myxoedema or with myxoedematous symptoms will react readily under thyroid and if the increase in weight is due to myxodema she will lose in weight under thyroid. But you can give some patients huge doses of thyroid and it will have no effect. If you give the right thing you will get the proper effect; if not, you cannot expect it.

That much to direct your attention to the anterior and the posterior lobes and to the theory of how they act. The problem for you to help solve in the future is how to pick out and definitely decide on these symptoms, other than gynaecological, which are due to hyperpituitarism, for instance; and you will find many patients with hyperpuitarism who simulate a hyperthyroidism. The idea we have in mind is that if mammary extract antagonizes the previous stimulation of posterior pituitary lobe sufficiently to make a fibromyoma atrophy, or sufficiently to contract the uterus and stop a menorrhagia,—it may be that it will do the same thing for that pituitary lobe in nervous conditions due to hyperpituitarism,—and on that rests the greatest future for gland therapy; for that statement brings us closer and closer to the diseases of the mind,—dementia precox, manic depressive insanity, all the various mental diseases, states of anxiety, which I believe, as surely as I am standing here, are every one of them due to a gland anomaly or glandular abnormality,—simply evidencing their phases psychically and not physically. This study of the physical stigmata will enable you to put your finger on the gland or glands at fault, and where you have a mental anomaly associated with a physical anomaly, the physical anomaly may be sufficient to

direct your attention and you will have something to guide you to the gland or glands at fault.

At or about the change of life period we have innumerable mental changes, the vast majority of them not pronounced enough to come under the phase of mental disease but sufficiently pronounced to cause you to be on the alert, and there you have something to guide you. A patient, for instance a woman of 25 or 30, suddenly develops a mental change, a psychosis, and her menstruation stops. Some doctors will tell you she stopped menstruating suddenly and then the psychosis appeared,—*post hoc ergo propter hoc,*—there is the supposed cause. Does not that same abnormality which affected her mind also fail to stimulate the genital tract, and the amenorrhoea and the phychosis are due to the same endocrine cause. Changes at or after the change of life period take on sometimes the form of melancholia. Watch all these cases for hypothyroidism. Many of them will improve on thyroid extract. You may have the slow pulse, the dry skin, the mental lack of perception, and there may be an amenorrhoea, and you give the patient thyroid; and whether or not you bring back the menstruation you are supplying what the patient needs.

I believe that marked depression, this melancholy tendency, rarely comes with hyperthyroidism; and when you have your manic depressive type,—the insanity with a manic type for weeks, depressive type for a few weeks,—who knows but that the changes,—hyperpituitarism hyperthyroidism or hypopituitarism hypothyroidism—may not alternate? For a certain while in many patients you have menstruation and then amenorrhorea, your over and then your understimulation.

I want you to know what each gland extract does, why we use it and what the theory is, and if you have a theory, and it works out in practice, the chances are that it is correctly founded.

CHAPTER XXII

CASES

M. M.

Seventeen years of age. Menstruation at 15½ years, at intervals varying from 11 months to 8 weeks. Has had whooping cough, measles when 8 years old, chickenpox at 10 years,—all slight.

Complaint: Pain on the right side for 6 months, and a full feeling in the stomach after eating.

Rectal examination: A very small uterus, not much larger than a thumb, much nearer the symphysis than normal; unusually long utero-sacral ligaments. The patient is of slight build, a brunette, physically active, and a very bright student at college.

Therapy: Ovarian extract 5 grs, thyroid extract 1/10, pituitary posterior 1/3. Therapy began June 17, 1919.

The patient menstruated once in August freely and once in October, but noted that she is constipated since taking the prescription. For the next few months the pituitary posterior was omitted and ovarian residue was administered. No menstruation since then.

April 29, 1920. Blood pressure 100.

June 10th. Blood pressure 100. The white line on scratching of the skin was marked, turning red only very slowly.

Therapy: Ovarian extract 5 grs., thyroid 1/10 gr., pituitary posterior 1/3 gr.

June 17th. Patient complains that after taking the above prescription she had for two days and for the first time in her life frontal headaches. The pain in the right side has recurred. She notices again that she is constipated from taking the above prescription. This last change was likewise noted when the same medication was prescribed in June, 1919.

Scratching of the skin causes a white line, which quickly becomes red.

Rectal examination: Uterus of the same size as at first examination; left ovary very small; right ovary larger and nodular, and sensitive.

In my experience the most difficult field for endocrine therapy lies in the field of actual or relative amenorrhoea with small hypoplastic uteri. The same difficulty is observed in the treatment of actual or relative amenorrhoea associated with atrophy of the uterus, such as is observed in cases to which we apply the term dystrophia adiposogenitalis or degeneratio adiposogenitalis. This case is a dystrophia; however, there is not the faintest suggestion of adiposity. From every viewpoint the patient's thyroid is functionating normally. If the posterior pituitary is at fault there is certainly no inclination to the taking on of fat. The ovaries are hypoplastic, and we must place the blame on their lack of secretory activity, with a lack of ovulation. The suprarenal glands are probably at fault. I should say from my observation that the so-called female glands, having reference, in addition to the ovaries, to the posterior pituitary and the adrenal medulla, are insufficient. There is probably a predominance of function on the part of the anterior pituitary and the adrenal cortex. It would be interesting to note the effect of large doses of corpus luteum.

May 5, 1920.

MRS. H. F.

Married 10 years, 0 para; curettage 3 years ago.

Menstruation began at 14 regular, duration 3 days.

Her menstruation now occurs regularly, growing gradually less since the curettage and for the past year is only a slight stain.

Husband's specimen is normal.

Complaint: Headaches, *amenorrhea,* and gain in weight of over thirty pounds since the curettage.

Examination: Small uterus.

Therapy: Ovarian, thyroid, ov. residue, post. pituitary.

July. Menstruation improving.

March 15, 1920.

B. M. (Single) 37 yrs. old

Menstruation began at 13 years.

Menstruation regular, 5 days' duration. For the last 2 months has menstruated every 2 weeks, and very profusely.

Premenstrual pain in the legs; headaches, irritability; mother had same symptoms before menstruation, and in her case the menopause developed at 53 years.

Had measles, whooping-cough, croup and frequent sore throats.

Sleeps well, dreams little, "lack of pep," passes more urine before each menstruation; has a drawing feeling along the front of the right leg; hands and feet cold.

Chief complaint: Headaches (3 years) and menorrhagia.

Examination, rectal: Pelvis normal.

Blood pressure 140.

Therapy: Mammary, thymus, thyroid 1/6, placenta 3 grains.

April 17, 1920. Patient had begun to bleed on April 6th; under the above medication she menstruated very little. Headaches have not disappeared.

April 26th. Improved in every way. Blood pressure 130.

May 21st. Headache practically gone. Menstruation normal.

April 5, 1920.

A. L.

Menstruation 17 years. Q. 28 days; 5 days, much pain.

Menstruation began at 13 years. Regular; no pain at that time.

Patient had measles, whooping-cough and scarlatina at 10 years of age.

Has had "spells" after menstruation, only once between menstruation. They occur at night, always. The muscles of her face move, but she does not bite her tongue. For two years knew nothing of them, but since she is at boarding school she realizes their periodicity. She recognizes an attack

because "she wakes up tired and drowsy." Her bowels are normal, she sleeps well, plays tennis and basket ball, and is otherwise normal.

Examination, per rectum, shows nothing abnormal. Her thyroid appears enlarged; no suggestion of trichosis.

Therapy: Mammary, thymus.

April 19, 1920. Mammary, thymus.

May 3. Menstruated April 28, 4 days late (due to mammary and thymus), with slight dysmenorrhora.

Therapy: Mammary, thymus, placenta and ovarian residue.

May 17. Has had no attacks. Pressure 115, pulse 76.

June 21. Menstruation May 25. Pressure 105. Perfectly well. Therapy: As of May 3.

Patient had no attacks while under my care, but on returning to her home in North Carolina developed the same attacks.

May 13, 1920.

E. R.

Twenty-five years of age.

Menstruation began at 16 Q. 3 weeks, later Q. 4 weeks.

Menstruation now Q. 3 weeks, 6 days' duration, losing much blood, little pain.

Once had an amenorrhea of 2 months and one of 3 months.

Premenstrual phenomena, none.

Had measles, chickenpox and whooping cough.

Diphtheria at 18 years of age, and had 3 injections of anti-toxin.

After her attack of diphtheria she went to school and found herself behind her class; then had an attack of grippe and finally left school.

After she left school she noticed that food went slowly into her stomach. She was in hospital for weeks; diagnosis of "cardiac orifice spasm."

Operated on twice: one, stretching of oesophagus; two, intra-oesophageal "cutting."

She is troubled with dreams of fearful nature; is afraid

she is "going to do something" to herself; is afraid she is "going crazy."

She has no moles, but acquired freckles 2 years ago.

She blushes readily; states she is bashful and self-conscious.

Red line reaction of the skin is marked.

Rectal examination shows several small fibroids in anterior wall. Pressure 120.

Therapy: Mammary, thymus, placental.

May 11. Pressure 115, pulse 90.

Therapy: Mammary, thymus, placental, thyroid.

May 28. Pressure 110.

Therapy: Continued.

June 1. Patient much improved. Menorrhagia better. Spasm on swallowing is vastly better.

May 18, 1920.

L. M.

Fifteen years of age.

Menstruation began at 13 years. Q. 3 months.

Menstruation now Q. 2 to 3 months, duration 1 week; loses much blood; slight pain.

Premenstrual phenomena: Headache, nervous, twitches, irritable.

Is large for her years, plump, rosy cheeked, smooth skin, blushes readily, no hair on arms or legs.

Takes long to fall asleep. Sleeps poorly; has dreams which frighten her; has nightmares, and dreams often of snakes.

Two years ago was in camp in the woods and boys often brought in dead snakes.

As a child disliked Grimm's Fairy Tales and Little Red Riding Hood.

Was formerly good in school and in her studies, but now cannot memorize. She is tired and languid.

All these different things came on since the establishment of her menstruation.

Had measles, mumps, chickenpox and scarlatina.

Four years ago had a lump in her breast and her family were greatly concerned over it, but it has since disappeared.

Had ear trouble during the winter; has always been subject to colds, which are accompanied by swollen glands of the neck; has headaches over the eyes; her hands are always cold, though moist.

She is at boarding school, plays tennis and basketball, does Grecian dancing, takes violin lessons and formerly took piano lessons. Is not talented in music and finds practicing extremely irksome.

She has a domineering, aggressive mother, who wants to make her adept in all the so-called modern accomplishments.

Her main complaint when speaking to me, in the presence of her aunt who understands the patient well, is that she is always tired and cannot memorize.

Blood pressure 130.

Diagnosis: Pituitary posterior plus; anterior pituitary and thyroid and suprarenal cortex minus.

Therapy: Ovarian extract, thyroid, suprarenal extract, placental.

This case is extremely suggestive of a type of girl who, because of her pituitary anomaly, and because of the absence of proper understanding at home, can readily approach the type of Mrs. Sp. (page 454).

May 12, 1920.

MRS. L.

Twenty years old, married 4 years, no para, two artificial abortions, the last 2 years ago.

Menstruation began at 14 years, regular, duration 6 days, large flow, marked dysmenorrhea.

Of late flows for 3 days, but loses a large amount of blood.

For 4 years has had "stomach trouble" with occasional attacks of very severe pain accompanied by vomiting, and was told she had ulcer of the stomach.

Premenstrual phenomena: Four days' bearing down,

nervous, erratic and restless. Feels, as she describes it, extremely "scoldy," and on the second day of menstruation feels better.

For the last 3 months has headaches, chiefly occipital, and running down the spine. The right thigh is very sensitive.

Examination: Cystic ovary; the whole right side is extremely sensitive, especially in the region of the right kidney and gall bladder.

Therapy: Placental g. iii, thyroid g. 1/6, suprarenal g. ii.

May 19. Pain gone. Pressure 120, pulse 88.

May 28. Therapy: Continued. Condition, both physical and mental, remarkably improved.

MRS. E.

Married 10 years; 2 para, last 3 years ago; first labor instrumental; nursed 2½ months; 1 curettage.

Menstruation regular, 7 days' duration, much blood, always so.

Had whooping cough and measles and mumps when 19 years of age.

Symptoms: Pain in both ovarian regions, backache and menorrhagia.

Examination: Sclerosis of left broad ligament, due to cervical laceration; ren mobilis sinistra.

Therapy: Mammary, thymus, suprarenal.

March 16, 1920. Pain in both sides better; felt pain through region of diaphragm for 4 days after taking prescription and voided more urine, especially at night.

To overcome the action of the posterior pituitary, partly responsible for the menorrhagia and for possible pyloric irritation, she was given ovarian extract, thyroid, suprarenal, pituitary anterior.

April 6, 1920. Patient feels better; menstruation much less in amount.

A small intramuscular lump in the upper part of left rectus which was present at first examination has become much

smaller. Since taking prescription she observes "itching of the skin."

May 20, 1920. Patient feels better, stronger and "altogether different." Same medication continued.

March 11, 1920.

A. W.

Twenty-seven years of age. Unmarried. Menstruation began at 12, occurring 7 to 8 times a year.

Menstruation now Q. 6 weeks to 3 months, 3 days' duration. Has a dark brown discharge for 4 days preceding loss of blood. Has severe dysmenorrhea. All women of her family suffer from dysmenorrhea.

She is short, has a pretty doll-like face and excellent color.

Was always plump, and 3 years ago weighed 140 pounds; now weighs 190.

Has had diphtheria, whooping cough, scarlet fever and attacks of "appendicitis."

She has a little hair on the chin, linea alba, and on the sciatic surface of her legs.

Complaint: Dysmenorrhea and pain on the right side.

Examination: Uterus small, and retroverted, corpus luteum cyst of right ovary. Blood pressure 130. Patient is very emotional; libido is marked.

This patient has all outward characteristics of posterior pituitary minus with probable plus of adrenal cortex. She is typical of many cases of obesity with small uterus and irregular menstruation. It is more than probable that posterior pituitary minus, while responsible for some cases of dystrophia adiposo genitalis, finds its counterpart in symptoms of the same or suggestive type and yet the condition is due to posterior pituitary plus. The corpus luteum cyst is of importance.

Therapy: Ovarian extract and thyroid.

Patient menstruated on March 20th and again on May 8th. Dysmenorrhea absent. No change in weight. Blood pressure 120, pulse 80.

December 13, 1919.

MISS B.

First menstruation at 14. Regular, normal, no pain.

Menorrhagia began 3 or 4 years ago and then improved.

Always increased by swimming or exercise. For the last 3 months menstruation lasts 5 days; is increased in amounts with many clots.

Complains of pain in the right side and backache.

Rectal examination shows everything normal except a slightly enlarged right ovary.

Therapy: Mammary extract, grains 10, three times a day was administered with prompt and excellent results.

June 23, 1919.

MISS B.

First menstruation at 14 years. Menstruation Q 35 days; 3 days' duration, pains.

Premenstrual: Severe pain in the head.

Chief complaint: Backache and dysmenorrhea.

Therapy: Ovarian extract and thyroid.

After 4 months her reply was, menstruation comes every 30 days and is absolutely painless.

April 6, 1920.

B. M.

Thirty-seven years of age. Menstruation began at 13 years; regular; 5 days' duration; excessive flow with clots; marked headaches worse at menstruation for the last 3 years. For the last two months has been menstruating every two weeks.

Premenstrual phenomena: Pain in the legs, headaches, irritable. This irritability has always been present. Her mother, whose menstruation ceased at 53 years, always complained of the same annoyance. The patient sleeps well, dreams little, passes urine more frequently before each menstruation; takes an occasional cathartic. She complains of "lack of pep," of a drawing feeling along the thigh of the right leg, and of cold hands and feet.

Rectal examination: Normal.

Blood pressure 140.

Therapy: Placenta 3 grs., thyroid 1/6, mammary 5 grs., thymus 3 grs.

April 17th. Menstruation began on April 7th; the medication was taken during menstruation, which, however, was much diminished. Headache persisted during menstruation.

April 26th. Blood pressure 130; same medication.

May 21st. Patient menstruated on May 6th, after an interval of nearly 5 weeks; duration 5 days, but slight. The headaches between menstruations are much better, but have not entirely disappeared during the menstruation. Patient remarked that since taking the medication she needs no cathartic.

June 17th. Patient menstruated on June 8th, but only for one day. Her headaches are practically gone. She feels stronger in every way and wishes to renew her former athletic activities. Blood pressure 118.

In this patient the menorrhagia, which has persisted for years, and the headaches, which have come on in the last three years and which became extremely marked during the premenstrual and menstrual periods, are referred to overactivity of the posterior pituitary. The cold hands and feet, the lack of energy, and the blood pressure of 140 are to be referred to a moderate degree of hypothyroidism; this combination of thyoid minus and posterior pituitary plus is, in my opinion, one of the most frequent combinations in the way of endocrine abberation to be noted in women. It is especially frequent during the climacterium, and is, in my opinion, the most frequent cause of high blood pressure, especially at that period. As I have mentioned so often, the posterior pituitary is related to the development of fibroids, certain cases of glycosuria, and to many of the varying grades of pyschic deviations. Overactivity of this lobe of the pituitary is directly related in many cases to exaggerated libido. While we are only in the early stages of our knowledge concerning the manifestations

of endocrine conditions, the association of cervical polyps, of gallstones and of renal calculi, with other physical manifestations of posterior pituitary overactivity appears to me to be more than accidental. That an overactivity of the posterior pituitary associated, for instance, with a hyperactive thyroid, on the one hand,—and a hypoactive thyroid on the other hand, should produce different manifestations, is to be expected. When the added role of the suprarenals, thymus, parathyroid, gonads, and other glands, is taken into consideration, the variations in the clinical manifestations and in the types of disturbances may be readily granted.

March 12, 1920.

MISS S. G. (Sister of Mrs. B. F., p. 420)

Nineteen years of age. Tall, excellent figure, well proportioned.

Menstruation at 14 years, q. 3 to 4 weeks, 3 days, no pain.

Menstruation now q. 3½ weeks, lasting 2½ days for the last year, whereas during the two preceding years it lasted 5 days. She has gained progressively in weight. Each year as her menstruation has grown less in amount she has gained in weight up to 166 pounds.

There is the faintest suggestion of hair on the upper lip, but face, arms, thighs, etc., free of any hair.

Examination: Rectal; uterus while not enlarged has a fibroid nodule.

While the anterior and post. lobes of the pituitary are both excellent, the post. is apparently a little minus in its balance.

Therapy: Ovarian extract and thyroid.

The first miscarriage and the early deliveries of her sister, Mrs. B. F., are an evidence in the latter of post. pituitary activity during pregnancy. Both girls, like their mother, are broad and thick chested, healthy, and Mrs. F. from her features, nose and teeth had an unusually good anterior pituitary.

April 30, 1920.

B. M. (Single)

Menstruation regular, 2 to 3 days, no pain.

Premenstrual lasting ten days; fullness in the breasts; a strained feeling of tension in the pelvis; irritability.

Headaches before menstruation, both frontal and occipital.

Is extremely short-sighted and has double vision.

Complaint: A lump in the right breast which gets larger before each menstruation. (Fibroma-adenoma.)

Rectal examination: Pelvis normal.

Pulse 100; pressure 120.

Blushes readily; has numerous fine varicosities of the leg.

The slightest blow on any part of her body causes "black and blue spots."

Has a twin sister with the same ocular trouble.

Both had measles, chicken-pox and mumps at the same time; had scarlatina at different times.

The twin sister suffered for a long period from eczema and "burst a blood vessel in her eye."

Both are very near-sighted with "muscular trouble" involving the muscles of the eye.

Both have numerous varicosities of the lower extremities.

The twin sister was operated on for fibroid of the uterus; previous to operation she suffered from severe dysmenorrhea, and severe occipital headaches, which have disappeared since the operation.

Diagnosis: Thyroid plus, pituitary posterior plus.

Therapy: Mammary, thymus, placenta.

November 20, 1919.

MRS. R. P.

Married 2 years; 0 para, 0 abort., 0 operation.

Menstruation Q. 3 weeks, duration 3 days, no pain.

Complaint: Sterility.

Examination: Acute retroflexion.

Therapy: Ovarian extract and thyroid extract.

December 5th. Specimen of husband normal as to spermatazoa.

Menstruation December 23rd, which was a week late.

January 26th. Has not yet menstruated, but has menstrual pain, that is, a sensation as if she was going to menstruate.

Therapy: I. Placental extract, thyroid, stypticin. 2. Rectal suppositories containing 1/3 gr. of opium and 1/3 gr. of belladonna used each night before retiring.

February 11th. No menstruation as yet.

March 15th. Patient is gravid, and has been turned over to her family physician.

July 23, 1919.

MRS. A. A.

Married 14 months. Menstruation regular, 5 days' duration. Dysmenorrhea for 2 hours.

Examination: Acute retroflexion easily replaced by pessary.

Complaint: Why not gravid?

Therapy: Ovarian extract, plus thyroid.

Last menstruation August 25, 1919.

Therapy: Thyroid extract, plus stypticin, plus sodium bromide. Suppositories of opium and belladonna given for 3 days corresponding to what would have been each menstrual period.

Reason for the above was the menstruation of 5 days' duration and the dysmenorrhea. The patient's tall stature, general appearance and the just mentioned signs spoke for post. pituitary excess.

Is gravid. Delivered June 2, 1920.

December 8, 1919.

MRS. L.

Married 20 months. Precautions 15 months. Menstruation regular, 3 days, no pain.

Five months after marriage she flowed once between 2

menstruations after bathing in the ocean. This was followed by menorrhagia for 4 months.

Complaint: Why not gravid?

Examination: Retrodisplacement; cervical leucorrhea, not mucoid.

Card marked "doubtful prognosis."

Therapy: Ovarian extract and thyroid.

January 16th. Last menstruation December 12, 1919. Was next due January 9th.

January 30, 1920. Is 3 weeks over her period. In view of the history of menorrhagia was given placental, plus thyroid, plus stypticin. Each month she felt as if she were going to menstruate.

March 12, 1920. First examination since she went over her period. Is gravid; has a fibroid the size of a walnut on the anterior wall of the uterus.

Therapy: Placental, plus thyroid.

March 28th.

MRS. K.

Married 4 years; 0 para; precautions for only a few months.

Eight months ago miscarried at 2½ months.

Menstruates regularly, but only for 2 days, up to the last few months.

She had a menstruation on January 15th and then one on March 14th.

There was marked male type of hair distribution, and the card reads "therefore give pituitary post." On March 18th she was given ovarian extract, plus thyroid, plus pituitary post.

She menstruated on April 18th, which was her last menstruation.

On June 28th, after having spotted, she was given thyroid plus stypticin. Shortly after this she ceased her visits and was delivered in January by another physician.

September 24, 1919.

MRS. B.

Married 2½ years; 1 abort., 2 years and 2 months ago. No curetting.

Menstruation q. 31 days, 5 days' duration; pain.

Premenstrual: Dizzy, stomach upset.

Complains of pain in the right side and in the rectum, backache. Frequent urination by day.

Complaint: Why not gravid?

Diagnosis: Apparently O. K.

Therapy: Ovarian extract and thyroid.

The card says: This is given because of delayed menstruation, but one week before menstruation give thyroid only.

October 10th. Gave thyroid and stypticin.

This alternation of treatment was kept up for 2 months. Patient continued treatment in her home in Panama.

A letter received from Panama states that the patient is 3 months pregnant.

January 24, 1918.

MRS. A. C.

Married 2 years. Menstruation regular before marriage. Subsequently amenorrhea for 3 months, then for 5 months, then for a year. Last menstruation was brought on after hypodermics of corpus luteum administered by her physician. In noting the characteristics of this patient, the history recalls, among the physical signs, trichosis of the chest, back, thighs. Viewed from the standpoint of the endocrines, the diagnosis was pituitary anterior plus, adrenals (cortex) plus, pituitary posterior minus, ovarian secretions minus.

Examination: Small uterus, small ovaries.

January 29th. A hypodermic of pituitrin produced no reaction.

January 30th. A hypodermic of ovarian residue produced no reaction.

January 31st. A hypodermic of adrenalin made the pa-

tient feel weak, caused her to become pale, and the cardiac palpitation was noticeable.

Therapy: Ovarian extract 7 gr., thyroid extract ¼ gr., posterior pituitary 1 gr., in capsules 3 times a day.

The patient began to menstruate after 6 weeks, and thereafter menstruation recurred every 6 weeks, lasting 4 days.

December 30, 1918. Examination shows the ovaries and uterus to be apparently normal.

June 14, 1920. This patient, who lives in Philadelphia, announced to me, through a patient whom she referred to because of sterility, that a baby had been born to her in March, 1920.

August 28, 1916.

MRS. L. M. C.

Married June 15, 1916. Menstruation previously regular. Last menstruation June 26, 1916, lasting only 1 day.

August 28, 1916. Diagnosis: Pregnancy.

Life November 14, 1916.

The delivery in this patient was an exceedingly long and tedious one, during which small doses of pituitrin (2 minims) were given. At least 20 hypodermics were administered.

July 25, 1918. Patient complains of dysmenorrhea a week before menstruation and of menorrhagia lasting 5 days.

Therapy: Ovarian extract, plus thymus, plus suprarenal.

September, 1919. Ovarian extract, plus thyroid, plus pituitary whole gland, because she desires to become pregnant.

February 19, 1919. Patient wishes to know why she does not become pregnant as she has been anxious to for several months.

Therapy: Ovarian extract, plus thyroid.

March 19, 1919. Ovarian extract, plus ovarian residue, plus hypodermics of ovarian residue.

June 4, 1919. Thyroid extract, plus suprarenal.

Last menstruation June 26, 1919.

Delivered April 7, 1920.

May 8, 1919.

MRS. P.

Married 3 years. Precautions 2 years; 0 para.; 0 abort.; 0 op.

Menstruation Q 30 days-40 days, 5 days' duration; profuse, with pain.

Premenstrual: One week; pain in the legs; sense of bearing down; irritable. Last menstruation April 25th.

Has gained 30 pounds in a few months.

Diagnosis: Uterine adenoids.

Therapy: Ovarian extract and thyroid.

Patient conceived at once. Has been delivered of a baby.

October 1, 1919.

MRS. A. K.

Married 2 years; 1 miss. one year ago at 2 months. Menstruation regular, duration 1 week. Dysmenorrhea.

Complaint: Why not gravid?

Examination: Cystic left ovary.

Therapy: Ovarian extract gr. 7, thyroid extract gr. 1/6 T. I. D.

Patient menstruated on October 9th. Amenorrhea since then. Life felt February 15th. Her pregnancy has taken a normal course.

MRS. M.

Married 13 years; 2 para, second 5½ years ago.

Menstruation Q. 21 days, 5 days' duration, no pain, normal amount.

Complaint: Headaches and sleeplessness. For the latter veronal had been used.

Examination: Normal.

Diagnosis: Posterior pituitary overactivity.

Therapy: Placental Ext. g. iii, t. i. d.

Shortly after taking the above prescription there was a marked improvement, the patient sleeping without the use of

any veronal. Menstruation came on May 5th, which is the first time in months that the menstruation interval was as long as 28 days.

This case, as do many others, instances the not infrequent effect of placental extract in delaying menstruation, even when the interval is of normal duration and especially so when the interval is short. I attribute this action to the inhibition which the placenta physiologically exerts on the posterior pituitary. It is the inability on the part of the thyroid, corpus luteum, and the trophoblast cells of the impregnated ovum to inhibit the menstrual stimulus of the posterior pituitary which accounts for very many cases of sterility. Fecundation takes place but nidation progresses only slightly and the microscopic ovum is cast off by menstruation. This menstruation occurs at the normal time or may be delayed from 2 to 10 days. Those sterile patients, who are treated by ovarian extract, ovarian residue, thyroid, etc., should normally menstruate at the regular time, or even a day or two earlier. If with such therapy a patient occasionally goes two or more days over her period, it may be judged that fecundation and an attempt at nidation have taken place. Many patients, with a normal menstrual interval, go from 2 to 10 days over their period, 1 or 2 or 3 times a year.

When such a history is given, the possibility, in fact, the probability, of the earliest form of miscarriage should be taken into consideration. Judging from the effect that placental extract has evidenced in several hundred cases, it is the best of all the extracts in this type of sterility. It may, of course, be combined with any other of the gland extracts which are indicated for the purpose of delaying or diminishing menstruation, excessive menstruation or irregular uterine bleedings in other conditions than those treated for sterility.

December 20, 1919.

MRS. E. O.

Married 7 years; 0 para, 0 abort., 0 op.

First menstruation at 13 years of age. Menstruation q.

5 weeks at first, now q. 4 weeks. Last menstruation November 28, 1919.

Complaint: Why not gravid? (Precautions for 6 years.)

Examination: Normal uterus with whistle cervix. Tiny fibroid on the anterior wall. Both ovaries cystic.

Therapy: Ovarian extract and thyroid.

Last intercourse December 29, 1919. Last menstruation December 30, 1919.

January 9, 1920. Patient stated that she began the medication again one day after her menstruation was over and started to bleed again.

Note made on January 9, 1920, states: "One week before her next expected menstruation I ought to change the medication because she menstruates for 7 days."

January 23, 1920. Patient was given placental, plus thyroid for 1 week. She went over her period and I considered her pregnant, but made no examination.

February 22, 1920. Patient commenced to bleed and in spite of therapy she had a profuse menstruation, expelled several large clots and was given ergotol in repeated doses. She was kept in bed for 7 days without examination or any attempt at curettage.

March 3, 1920. Patient was examined, found to be normal, and was given thyroid extract grain 1/6th, t. i. d.

It might be thought that this patient was not pregnant. At any rate, one is compelled to say that after the administration of placental extract and thyroid she went over her period due on January 30, 1920, until her bleeding and probable miscarriage of February 22, 1920.

June 23, 1919.

MRS. S.

Married 6½ years; 1 miscarriage, 6 years; 1 para, 4 years. Menstruation regular, 3 days' duration, slight pain. Patient stated that her womb was "out of place" when she consulted a physician several years ago; that he "straightened"

the womb with a pessary and that she then became pregnant.

Examination: Normal.

Complaint: Why not gravid again?

Therapy: Ovarian extract, grs. 7; thyroid extract, gr. 1/6.

Last menstruation occurred August 30th.

November 11th. Patient began to spot and stain. In spite of rest in bed and the administration of thyroid extract and the use of suppositories of extract of opium gr. 1/3, extract of belladonna gr. 1/3, the patient miscarried.

The patient was not curetted.

November 21st. Mammary extract, grs. 10, t. i. d.

January 14, 1920. Because of excessive menstruation mammary extract, grs. 10, and thyroid, grs. 1/6, t. i. d.

February 16th. Patient is again anxious to conceive.

Therapy: Ovarian extract, grs. 7; thyroid extract, gr. 1/10.

May 12th. Ovarian extract, grs. 7; thyroid extract, gr. ¼.

May 26th. As the patient anticipates her menstruation the 1st of June, thyroid extract, gr. ¼, and placental extract, grs. 3, are prescribed.

June 11th. Patient is a week over her period.

Therapy: Thyroid extract, gr. ¼; corpus luteum, grs. 3; placental extract, grs. 3.

This patient has been wearing a pessary since her miscarriage of November, 1919. She belongs to the class where nidation does not take place readily. This process must be aided by the administration of endocrines which aid nidation and prevent the menstrual stimulus from expelling the fecundated ovum. This patient has had two miscarriages and in each of the two instances that she has become pregnant, while under my observation, ovarian extract and thyroid were given as a preliminary treatment. Based on the experience of her miscarriage of November, she is taking placental extract, corpus luteum and thyroid to aid in the continued nidation and to ward off the menstrual stimulus which in many patients is

noted during many or all the months of pregnancy. If this recurrent attempt to menstruate can be warded off till "life" is felt, the prospects of a successful termination are most promising. The therapy is to be continued up to the stage of seven and a half or eight full months.

May 4, 1919.

MRS. J. S.

Married 2 years; 0 para, 1 abort. one year ago, having been curetted when 2 weeks over period.

May 4, 1919. Menstruation previously every 26 days, 5 days' duration; premenstrual annoyance 3 days, consisting of pain in the breasts. Is nauseated, urinates often and menstruated last on March 10th. On May 15th she began to spot, suffered from uterine cramps and then expelled large clots. She was given ergotol for 4 days when her bleeding ceased. Patient was told that in all probability her uterus was entirely free of the ovum and that no curetting would be needed. She was quite astounded as her mother and all her friends had never heard of a miscarriage having been treated except by curettage. In 10 days she was up and about and during the summer was given ovarian extract and thyroid extract. At each visit the patient recounted the surprise of all her friends and the numerous physicians whom she met that she had not yet been curetted.

Her last menstruation occurred on October 30th.

December 15th. Therapy: Thyroid extract, plus placental, plus stypticin. At each period corresponding to her menstruation patient suffered from cramps and felt as if she were going to menstruate. She was kept in bed for several days during each of these periods, during which days she was given, in addition to the above capsules, suppositories containing 1/3 grain of opium and 1/3 grain of belladonna.

March 12, 1920. First examination since she became pregnant. Uterus normal in position, patient feels life. Above methods will be continued until she is delivered.

MRS. P.

Married 3 years; 0 para. Last menstruation January 20th.

Examination: April 8, 1920. Diagnosis, pregnancy, acute retroflexion.

Patient is advised to spend 2 hours every day flat on her face and to sleep as much as possible in that position.

The only noticeable features are varicosities and varicose veins on leg, which have been present for years.

Patient has been seen every 2 weeks. Her only complaint was constipation.

Therapy: May 12, 1920. Thyroid extract gr. 1/6, sodium bicarb. gr. 10, phenolphthalein gr. 1/3 gr. t. i. d.

June 9th. Has cramps as if she was going to be unwell and has a spotting of bright red blood.

Therapy: Rest in bed, capsules of placental extract gr. 3 and thyroid extract gr. 1/6 q. 4 hours; suppositories of opium gr. 1/3 and belladonna gr. 1/2 at night.

July 20th. Pregnancy uninterrupted.

January 12, 1920.

MRS. B. G.

Married 7 years; 1 para. 5 years ago; instrumental delivery. Menstruation regular, duration 2 days. Has gained 35 pounds since her baby was born.

Complaint: Pain on the right and left side, backache. Anxious to become gravid again.

Examination: Acute anteflexion and enlarged and sensitive right ovary.

Last menstruation January 3rd.

Therapy: Ovarian extract gr. 7, thyroid extract gr. 1/6.

February 9th. Is now 1 week overdue; complains of pain in the right side.

NOTE: Did the ovum come from the right ovary?

February 25, 1920. Nausea marked. Occasional uterine cramp.

Therapy: Thyroid extract 1/6, stypticin gr. 1½, in capsules t. i. d.

The left breast discharged colostrum continuously. Patient states that the left breast "leaked" for 4 months during her first pregnancy.

April 7th. Therapy: Thyroid extract 1/6, corpus luteum gr. 7 t. i. d.

Patient complains that her hands and legs feel swollen. There is no oedema or pitting. Urine normal.

May 7th. Blood pressure 110.

Therapy: Thyroid extract continued.

MRS. F.

One para. 4 years ago. During this first pregnancy she spotted during the first 4 months at what would have been 3 menstrual periods.

Two years subsequently the patient miscarried in the second month of pregnancy; was curetted because of excessive bleeding. On several occasions mammary extract and ergotin have been administered for menorrhagia. Patient became pregnant for the third time, last menstruation occurring on January 22, 1920.

February 18th. Patient had cramps and spotted for 1 day.

Therapy: Placental extract gr. 3, thyroid extract gr. 1/6.

April 14th. Cramps again. Therapy continued.

June 11th. Blood pressure 135.

Therapy: Thyroid extract 1/6 t. i. d., which will be continued until delivery. The thyroid extract aids in the nesting of the ovum, inhibits overactivity of the posterior pituitary and is indicated whenever the blood pressure in a pregnant patient is over 120.

December 9, 1919.

MRS. K.

Married 7 months. Menstruation regular. Dysmenorrhea.

Last menstruation, October 27th, was less than usual in amount. Slight bleeding was noted in December and in January.

When examined on December 9th, the patient was pregnant, but the uterus seemed larger than expected if October 27th were the last normal menstruation.

Patient spotted and stained December 20th.

Therapy: Placental extract gr. 3, stypticin gr. 1½ t. i. d. Suppositories of opium and belladonna.

Murphy drip containing 5 per cent. glucose and 2 per cent. sodium bicarb. given daily for the marked nausea.

March 22nd. Has cramps of the type experienced in the dysmenorrhea. Same therapy was observed.

This patient belongs to that type in whom the menstrual stimulus is unusually marked during pregnancy. Therapy is based on the theory of overactivity of the posterior pituitary gland.

MRS. A. F.

Married 8 years; 1 para. 7 years ago.

Abdominal ligament suspension for retroflexio mobilis 2 years ago.

Complaint: Headaches and dysmenorrhea.

Last menstruation March 1, 1920.

May 10th patient noted a slight stain of blood, with a feeling as if she was going to be unwell.

No examination.

Therapy: Placental extract gr. 3, thyroid extract gr. 1/6 in capsule form q. 4 hours.

Rectal suppositories extract of opium gr. 1/3, extract of belladonna gr. 1/3 t. i. d.

After 5 days in bed patient was gradually permitted to resume her usual routine and was warned that a like experience was possible every 28 days during her pregnancy.

June 15, 1915.

MRS. B. F.

(One of the proofs of the therapeutic action of anterior pituitary)

Married 2 years; 0 para. Last menstruation February 7th. Life felt July 2nd.

This patient miscarried when 6½ months pregnant.

December 4, 1915. Was given thyroid extract grain 1/10, plus arsenious acid 1/30th, plus bichloride of mercury grain 1/100, plus oxalate cerium grains 5, in capsule form T. I. D. This was continued for months.

January 11, 1916. Last menstruation. Was given bichloride of mercury 1/100th, arsenious acid 1/30th, thyroid extract 1/10th, plus stypticin grains 2, in capsule form T. I. D.

September 27, 1916. Delivered of a baby girl.

June 27, 1919. Pregnant; last menstruation April 25th.

Therapy: Bichloride 1/100th, plus thyroid 1/10th, plus arsenious acid 1/30th, plus oxalate of cerium.

Life September 10th. Delivery January 17th.

February 20, 1920. After a severe influenza, during which she did not nurse her baby, she was given suprarenal extract, plus whole pituitary gland. She resumed nursing. She began to spot.

March 5, 1920. Because of the spotting she was given suprarenal extract and pituitary anterior.

March 12, 1920. Feels perfectly well; spotting has stopped. Patient has an active pit. post.

August 25, 1919.

MRS. L. C. H.

Married 2 years.

Menstruation regular, Q 28 days; 5 days' duration.

Last menstruation June 11, 1919. Gravid.

The physician who sent her to me stated that her husband had a Wasserman plus.

Therapy: Thyroid extract grain 1/10, plus bichloride of mercury grain 1/100th, plus arsenious acid grain 1/30th, plus oxalate of cerium grains 5.

This was taken 3 times a day throughout her pregnancy and has for many years been my therapy for all cases of repeated miscarriage with Wasserman plus, and for all cases where to my knowledge the husband is Wasserman plus.

Delivery at normal date. Perfectly healthy baby.

January 17, 1918.

MRS. W.

Married October 28, 1917. Last menstruation November 11, 1917. Slight nausea. Has previously taken specific treatment, but informs me that the last Wasserman is negative.

Examination: Gravid.

Is given thyroid 1/10th, plus bichloride of mercury 1/100th, plus arsenious acid 1/30th, plus oxalate of cerium grains 5.

Patient miscarried after spotting for 1 week when pregnant 3 months.

December 10, 1919. Patient reports that her menstruation was October 30, 1919.

March 10, 1920. Therapy: Thyroid 1/10th, plus bichloride of mercury 1/100th, plus arsenious acid 1/30th, plus oxalate of cerium grains 5.

Patient is normally gravid. The medication has been continued and is to be continued until delivery. Normal baby.

February, 1920.

E. M.

Unmarried. Complains for 3 years of menorrhagia.

Examination: Uterus enlarged.

Therapy: Mammary extract, grs. 10 T. I. D.

After taking this prescription there was for the first time an amenorrhea of 3 months, followed by a menstruation, associated with the loss of a very large amount of blood. During this menstruation patient again took the mammary extract. When seen on June 9th she was quite pale, complained of flushing. Pulse 108, blood pressure 145.

Examination: Round hard fibroid larger than a navel orange fills the upper part of the vagina with its pedicle extending up the cervix. As the patient is unable to go to the hospital at the present time she is given mammary extract 7 grs., thymus 3 grs., Blaud's mass 3 grs., in capsule form t. i. d.

June 24th. Fibroma removed.

January, 1920.

F. G.

Married 21 years; 3 para., the last six years ago.

Menstruation Q. 3 weeks for the last 5 years; duration 7 days; large amount of blood lost.

Examination: Enlarged uterus.

Diagnosis: Fibrosis uteri.

Therapy: Mammary extract.

March 15th. Patient has been spotting almost continually for several weeks.

Examination: A round hard fibroma, the size of an apple, is in the vagina, its pedicle extending up a distance of nearly 2 inches into the uterus.

Operation: Removal of the fibroma, the base of the pedicle being readily reached through the greatly dilated cervix. Thorough curettage. During her stay in the hospital patient was given mammary extract.

April 19, 1920. Uterus normal in size; blood pressure 140.

Therapy: Thyroid, gr. 1/6 t. i. d.

June 16th. Blood pressure 148; no reduction in blood pressure after administration of thyroid.

Therapy: Mammary extract, thymus, placenta.

Not only have ergotin, likewise stypticin, been replaced by mammary ext. in the forms of menorrhagia and metrorrhagia associated with enlarged uterus, but the added value is noted in the not so infrequent expulsion and delivery through the cervix of unrecognized submucous fibromyomatous tumors. (See previous case.)

MRS. J. W.

Two para., the last 12 years ago.

Last menstruation May 15, 1918. Complains of nausea, pain in the breasts, pressure on the bladder.

June 28, 1919. Examination: Patient is gravid. The uterus, however, is the size of a 10 weeks' pregnancy, feeling almost like a double uterus or possibly a twin pregnancy.

From the 6th month on it was quite apparent that there

were numerous myomata which could be readily felt by the external hands.

The patient was delivered after two false alarms, each of which began with pain, lasting for several hours, and then gradually diminishing.

Examination two weeks after delivery showed the uterus to be very much enlarged and more than eight distinct nodules, varying from the size of a large marble to a small apple, were readily palpated.

Immediately after labor the patient had been given ergotol ½ dram., Q. 3 hours. This was now replaced by mammary extract, gr. x, ergotin gr. 1.5, pituitary anterior, grs. 2, in capsule form. At the end of eight weeks the uterus was of normal size, with scarcely a nodule to be outlined by the examining fingers.

This disappearance of myomata in the post partum period in patients who nurse the baby is by no means an infrequent occurrence, and is probably overlooked many times because no examinations are made. In those patients who do not nurse their babies, and even in those who even though nursing spot and stain at irregular periods, the administration of mammary extract is a very valuable and rational procedure.

February 11, 1920.

MRS. S.

Married 14 years; 0 para.; 1 abort. 10 years ago at the 10th week. No operation.

Menstruation began at 13 years, regular; one week duration; large amount.

When married the patient weighed 160 pounds. Within the first year *after marriage* she attained her present weight of 200 pounds. She is tall, broad-shouldered, her fat is well distributed; has a very rosy complexion.

Complaint: Menorrhagia, pain in the left side, pain between the shoulder blades, frequency of urination.

Examination: Uterus contains two large fibroids and is the size of a 3 months' pregnancy.

Therapy: Mammary extract.

March 15, 1920. Her menstruation of March 1st was of 7 days' duration, but less in amount.

Therapy: Mammary extract and pituitary whole gland.

April 12th. The uterus is decidedly smaller.

Therapy: Mammary, thymus, pituitary whole gland.

May 3rd. The fibromyoma in the right horn is much smaller.

Therapy: Mammary, thymus, placenta.

May 19th. Patient complains of haemorrhoids which have appeared in the last 3 weeks.

June 16th. Blood pressure 130. Uterus not one-half the size noted at first examination.

Therapy: Mammary, thymus, placenta, suprarenal.

March 23, 1920.

MRS. G. L.

Married 10 years; 0 para., no abort., no op.; curetted at 18 for dysmenorrhea.

Menstruation began at 12. q. 3½ weeks, lasting four to six days.

For the past six months she loses very much more blood, passing very large clots.

Premenstrual: Marked irritability.

Complaint: Headache and menorrhagia.

Diagnosis: Fibromyoma, size of three months.

Therapy: Mammary g x—thymus gr. v.

April 6th. Menstruation came at the expected time; patient suffered great pain from the clots; bleeding lasted longer but was less in amount. The size of the tumor was quite reduced. Prescription was continued during menstruation, as it is probable that it acts best at that time.

Therapy: Mammary g x—thymus gr. v, thyroid g 1/6.

April 14th. Patient stained slightly for one day. Has noticed palpitation and constipation.

Therapy: Mammary, thymus, thyroid, suprarenal.

April 21st. Is constipated since taking her medicine and tumor appears a little larger.

Therapy: Mammary, thymus, placental.

April 30th. Menstruation appeared on April 23rd with a loss of much blood.

Therapy: Mammary, thymus, thyroid, iron and arsenic.

I advised a curettage and subsequent endocrine medication. Submucous fibroids do not cease bleeding on the above therapy, but they may be extruded as a consequence of medication.

February 25, 1920.

MISS E. O.

Forty years old. Menstruation regular, 3 days.

Associated with frontal headache, pain in the right side, drawing in the legs.

Premenstrual (1 week), "dragged out, headachy, depressed, cries easily."

Pain in the right side; always worse at menstruation.

Obstipated; pain in back and rectum.

Reddish leucorrhea for 1 year.

Burning urination during menstruation.

Hands cold; sleeps poorly; wakes up several times a night and continually thinks about her sister who was ill of an incurable disease for many months and who had since died.

Has grayish streaks in her hair.

Eyes and face and expression are those of melancholic depression.

Examination: Fibroid in the right horn of the uterus; right ovary enlarged; pulse slow; pressure 130.

Amount of urine excreted in 24 hours, 3 pints.

Medication: Suprarenal extract, plus thyroid, plus placenta.

March 4th. Much improved, sleeps better, pressure 110.

June 30th. Fibromyoma has absolutely disappeared.

September 7, 1919.

MRS. S.

Married 12 years; 2 para, the last 7 years ago. Nursed for 4 months. Curetted twice, the last time August 25, 1919, because she was over her period and presumably pregnant.

Some premenstrual annoyance 1 week. Menstruation q. 24 days.

Complaint: Pain on the left side. Headaches plus vomiting almost every week. This annoyance developed after her first labor.

Examination: Uterus enlarged with 1 fibroid the size of a hickory nut.

Therapy: Pituitary post. given for diagnostic purposes.

October 9, 1919: Patient reports that she has had bearing down pains; that the medication acts on her bowels and bladder. Fibroid seems larger.

NOTE: (Pituitary post. is causing growth).

Therapy: Pituitary whole gland.

March 5, 1920. Fibroid larger, left ovary distinctly cystic.

Therapy: Mammary extract, plus thymus.

March 17, 1920. Headaches and vomiting gone. Last menstruation occurred on February 16, 1920. As the patient is always 4 days ahead of time she thinks she may be pregnant, and has cramp-like feeling as if she were going to be.

Therapy: Ovarian extract plus thyroid.

April 23rd. Last menstruations occurred March 18th and April 13th.

May 21st. Therapy: Mammary, thyroid and placenta.

June. Uterus shows scarcely a sign of fibromyomatous nodule. Headaches and nausea gone.

May 19, 1920.

MRS. H.

Married 21 years; 4 para, last 6 years ago; 2 aborts., last 10 years ago.

Nursed each of children for 9 months. During lactation there was amenorrhea for 8 months.

Five years ago curettage and plastic.

Menstruation began at 12 years. q. 4 weeks, 3 days.

Premenstrual phenomena: Headaches, nervousness, lasting one week.

For past 6 years menstruation q. 3 weeks, duration 6 days, loses much blood.

Complaint: Pain in the right side, headache, menorrhagia, loss of weight and anaemia (hmglobin 60).

For several years suffered from gallstone colics which usually occurred during menstruation. Once had slight attack of jaundice and x-ray ordered some months ago by family physician showed stone in gall bladder.

Pressure 130, pulse 84.

Examination: Small fibroid in right horn.

Her mother is 70 years old and has diabetes.

Patient was referred to me because this suggestion had been made that she should be curetted, and then receive radium treatment to bring about a cessation of menstruation. Since such treatment causes atrophy of the ovaries, I advised curettage and endocrine therapy.

May 26, 1920.

MISS C.

Twenty-five years of age. Unmarried. Menstruation began at 12½ years. Regular.

Has always lost a fair amount of blood at menstruation. Has always suffered from dysmenorrhea, which is worse during the last 4 months.

She suffers from headaches, which are premenstrual.

She has had diphtheria and pneumonia.

Her mother underwent a hysterectomy for fibroid and later an emergency operation for gallstones. A sister of this patient has a fibroid, became pregnant, and had a miscarriage. This sister is now suffering from diabetes.

Examination: Fibroids of the uterus, intramural and a

large subperitoneal fibroid of the left horn. Blood pressure 140.

This case, which I saw in consultation with her family physician, was interesting from standpoint of family history, not overlooking the diabetes in the sister of this patient. The patient had been given corpus luteum by her physician. I suggested the addition of mammary extract. While much may be accomplished with the intramural fibroids little can be expected from endocrine therapy as regards the subperitoneal tumors.

Subsequent operation showed both myomata and fibromata.

May 28, 1920.

MRS. R.

Married 2 years, for the second time; 1 para 5 years ago by her first husband.

Menstruation began at 16; regular. For the past year menstruation occurred every three weeks, 5 days' duration, scanty in amount. Has always menstruated scantily. She is irritable, depressed, cries easily; whenever she becomes excited her "menstruation comes on." Seventeen years ago she had a severe attack of pneumonia.

Examination: Uterus is enlarged, containing several fibromyomata, the one in the right horn as large as an apple, not firm in consistency. Blood pressure 140, pulse 62. She has, however, occasional attacks of tachycardia. She is tall, well built, with prominent bulging eyes. She complains of hemorrhoids, and has marked varicose veins.

Therapy: Placental extract, grs. 3; thyroid extract, gr. 1/6; ovarian residue, grs. 5.

The placental extract is given to antagonize the posterior pituitary which is held responsible for the fibromyomatous uterus; the thyroid is given because of the slow pulse; the ovarian residue is given because of the relative amenorrhea.

June 18th. Patient states that she feels better in every way; blood pressure 128, pulse 62.

Therapy: Mammary extract, grs. 7; thymus extract, grs. 3; thyroid extract, gr. 1/6.

The mammary and thymus are given for their direct effect upon the fibromyomatous uterus. This prescription and the one given on May 28th will be used alternately at various times in the hope that the menstruation may take place every 4 weeks and that the uterus will, as is confidently expected, return within 3 to 4 months to practically normal size. The fibromyomatous uteri, not associated with menorrhagia or metrorrhagia, that is with no submucous tumors, are favorable to endocrine treatment. Those tumors which are subperitoneal and are fibromatous and not myomatous are not so readily affected. In several cases they were brought to the surface and become more prominent, even though the uterus itself diminished markedly in size. Only the future will decide whether, as I believe, the anterior and posterior lobes of the pituitary are related to fibromata and to myomata respectively. The plan which I am following now of using placental extract in many of these cases bears in mind this possibility, that while placental extract inhibits the posterior pituitary it may stimulate the anterior pituitary,—hence the value of combining mammary extract, as a rule, when placental extract is given. Placental extract inhibiting further stimulation by the pituitary posterior; mammary extract contracting the uterus and, possibly, exerting an inhibitory influence on the pituitary likewise.

May 12, 1920.

MRS. M.

Married five and one-half years. 0 para.

Menstruation began at 12 q. 4 to 8 weeks. Menstruation subsequently came on q. 2, 4, 6 months.

Three years ago after a fall, and an amenorrhea of 2 months, she bled profusely and her physician said she had a miscarriage. Since then she menstruates less in amount and has gained 30 pounds in weight.

Her last menstruation was on January 27th and on April 22nd she stained slightly.

Patient has hair on chin and upper lip, thigh and legs.

Blushes readily, and so does her mother, who has a blood pressure of 160 and suffers from cervical polyps.

Examination: Small uterus.

Therapy: Ovarian, thyroid, placenta.

MRS. C.

April 14, 1920. Mrs. C., mother of above patient, Mrs. M.

Married 28 years, 7 para the last 11 years, no abort., 0 op.

Last menstruation March 3rd, duration 10 days.

Complaint: Pain in the right side, backache, excessive flow during the last 2 menstruations.

Examination: Cystic right ovary, cervical polyps.

Blood pressure 160.

Therapy: Mammary and thymus.

May 12, 1920. Blood pressure 150.

Therapy: Mammary, thymus.

April 27, 1920. Mammary, thymus, thyroid.

May 26. Pressure 140, purse 90.

Therapy: Placenta and thyroid.

The polyps will be removed by curettage.

May 12, 1920.

MRS. D. C.

Married 27 years; 2 para (17 years), 2 abort. (19 years).

Menstruation regular, 4 days' duration up to 7 weeks ago, since which time the patient spots almost continually.

Since the development of this symptom she has occipital headaches, pain in the left knee and left arm.

She ordinarily voids little urine, but for the last few weeks is disturbed at night by the desire to void.

Examination: Small cervical polyp.

Therapy: Mammary, thymus, placenta.

I view cervical polyps and overgrown endometrium as an evidence of overstimulation by the posterior pituitary. These rarely respond to any treatment except curettage.

February 20th.

MRS. J. B.

Married 4 years; 0 para, 1 abortion three years ago at 8 weeks.

Menstruation regular; 2 days; pain.

Premenstrual symptoms last for 10 days; pain, headaches, nervousness, tired; feels like lying down all the time. These symptoms are more marked since the abortion, especially for the last year.

Dysmenorrhea of late.

Urinates often by day and night.

Weight about the same.

Headaches much worse during the last year.

Markedly frigid.

When married had losses in the family and felt "heart-broken."

Is not young and expresses the opinion that this may have to do with her frigidity.

She was given ovarian extract (whole gland) and thyroid extract.

Pituitary extract post. was marked on the card as the indicated drug awaiting an answer as the amount of urine passed in the succeeding 24 hours.

She reported the next day that she passed 5½ pints in 24 hours.

A minus of the post. pituitary is thus suggested by her general symptoms and by the relative diabetes insipidus.

January 6, 1916.

MRS. F.

One para; menstruation regular. Weight 184 pounds.

Last menstruation October 3, 1915.

Had aborted previously.

October 17, 1915, was the first opportunity for impregnation.

Spotted December 24th.

Delivered June 25, 1916.

1920. Menstruation regular; last menstruation February 4th, but less than usual; says she "feels life" in spite of her menstruation. Stated that her grandmother did not know she was pregnant with one of her children because she menstruated for 3 months. Weight 193 pounds. Had gained in weight, but is now losing.

Examination: No pregnancy.

Blonde fuzzy hair over the face, but no change in the character of the nose. Has excellent color and is flushed. Suggestive of post. pituitary activity.

Insists that she "feels life." Is told that she probably is conscious of uterine contractions felt in exaggerated form.

Therapy: Pituitary extract; whole lobe; grains 5 T. I. D.

February 27th. Has the same sensation, the same "feeling of life."

Therapy: Placental extract, grains 5 T. I. D.

March 8th. Since taking placental extract has lost the sensation which she describes as the feeling of life. States that all of her family have changed life late; her mother at the age of 60.

Diagnosis: Post. pituitary overactivity, causing uterine contractions.

March 17, 1920.

MRS. H. F.

Married 12 years; 0 para, 0 abort. Operation 11 years ago left ovary and appendix removed. Round ligament operation.

Menstruation began at 16½ years; every 4 weeks, 1 day, scant. Always scant even before operation.

The visible thyroid, considerably enlarged, attracted attention. The patient replied that she had noticed it for 2 years.

Patient has had scarlatina, measles, croup (says she was always croupy), "malaria," "bronchitis every winter."

Is "nervous, and always was so"; is afraid to be alone;

is frightened because her father died of cancer, and so the "stitches in her heart" make her pay attention to her left breast. She dreams at night and is always frightened by them. She suffers from cardiac palpitation when she climbs the stairs, becomes excited or is frightened and is afraid that she may go out of her mind.

She flushes readily. She has a sore feeling over the stomach and under the left breast. She complains of headaches. She is not constipated, stating her bowels are always loose.

Examination: Pain in the left side and backache due to large retroflexed uterus containing a fibroid. A pessary which her doctor inserted failed to replace the uterus. Her pulse is slow and her hands are blue and cold.

The daily amount of urine as reported is normal.

Her headaches are in the back of her head, radiating down the neck and back of the ears.

Her husband states that for a year she had been taking "pituitary extract and also thyroid."

Diagnosis: Adrenal medulla plus, cortex minus; glandular ovary plus, with probable corpus luteum. Pituitary anterior is minus and posterior pituitary is plus.

Therapy: Pituitary anterior, ovarian residue, suprarenal extract, placenta.

June 9. Above extracts given in varying combinations have caused great improvement, but patient cannot be alone.

March 19, 1920.

MRS. H.

Married 12 years; 2 para, second 5 years ago; nursed for 18 months with no amenorrhea; 1 abort. 11 years ago.

Menstruation regular, 4 days' duration.

Symptoms: Pain in region of gall bladder and pylorus, backache, leucorrhea, "falling of the womb" and headaches.

Examination: Descensus uteri; fibrosis uteri.

Ideal vaginal operation, 1920.

April 14, 1920. Uterus enlarged, menorrhagia.

Therapy: Mammary extract and thymus.

April 27, 1920. Pain in the right hypochondrium and headaches.

May 12, 1920. Pain in right hypochondrium, burning sensation in tongue.

This patient has prominent bulging eyes, right eye more prominent than left. Her headaches are over right eye, over the scalp, and radiate down the neck.

Therapy: Thyroid and placental extract.

May 19, 1920. Patient feels trembly in the hands and is more nervous than usual. Pressure 110, pulse 92.

Therapy: Ov. residue, suprarenal, placental.

The case is one of hyperthyroidism, hyperadrenalism, with posterior pituitary plus.

May 26. Head feels better. Pressure 130, pulse 84.

The pressure rose after stopping thyroid and adding suprarenal.

Therapy: Plac., suprarenal, pituitary anterior.

June 21. Pressure 110, pulse 88.

MISS R.

Thirty-four years of age; unmarried. Complains of goitre which she says interferes with her breathing. Both lobes are affected, the right more than the left; the right is enlarged considerably and is soft. Though complaining of palpitation at times and of sleeplessness, her pulse on examination is only 60.

Therapy: Placenta, suprarenal, ovarian residue.

May 26th. Patient feels better, sleeps better; the goiter on the left side is smaller. Pressure 140, pulse 70.

Therapy: Same as above.

June 9th. Pressure 150.

Therapy: Ovarian residue 5 gr., thyroid extract 1/6 gr., placental extract 3 gr.

June 16, 1920. Pressure 140. Complains of headaches every morning and of a nasal catarrh each morning.

Therapy: Mammary, thymus, placenta.

June 30th. Better in every way. Goitre smaller.

March 7, 1918.

MRS. K.

Operated on for ovarian tumor, size of a 3½ months' pregnancy.

Seen in consultation November 25, 1919, for toxemia of pregnancy. Albumin, casts, blood pressure 180, rapidly failing vision, oedema legs and arms. No fetal heart sounds heard.

Castor oil administered; prompt response preceded by an eclamptic attack; morphine without atropine given in large doses.

Delivery of dead macerated fetus. Frequent eclamptic attacks, a severe one following spinal puncture for the associated profound coma; high colonic sod. bicarb. irrigations; morphine; gradual improvement. Complete recovery.

March 8, 1920. Last menstruation February 29, preceded by heavy throbbing in the neck, palpitation; tremor of the hands. Was nervous and afraid; had an attack of influenza with slight pneumonia 1 year ago.

At the present time hands and feet are cold, circulation is poor; has menstruated only twice since her eclamptic attacks of November 28th. Mother has a goitre in severe form and patient is fearful she will develop the same.

Diagnosis: Hypothyroidism with premenstrual hyperthyroidism. Adrenal involvement.

Therapy: Ovarian extract, plus thyroid, plus suprarenal.

NOTE: Will change prescription a week before menstruation.

May 21, 1919.

H. G.

Married 27 years; 1 para. 26 years ago; 1 abort. 23 years. Appendix removed 4 years.

Menstruation regular, 2 days' duration.

Premenstrual phenomena: Duration 1 week; dizzy, breasts full, depression.

Complaint: Pain in the right side, backache, a sense of dropping down, troubled with dreams.

Examination: Small fibroid in the uterus.

Therapy: Mammary, ergotin, pyramidon.

September 6, 1919. Examination shows fibroid polyp of the cervix not present at the first examination. This polyp was apparently extruded by the above medication.

December 16, 1919. The fibroid polyp protruding from the cervix has caused no bleeding.

February 9th. Therapy: Pyramidon and placenta.

February 25th. Patient reports that the medication makes her feel tired.

March 16th. Continuation of the same medication makes the patient tired and languid, and her legs feel "like paralyzed."

This patient is one among the many of the several hundred to whom placental extract was administered who remarked that she felt tired and sleepy. When I first began the administration of placental extract, one of the principles guiding its administration was the probability that it was an antagonist to the posterior pituitary. Many of the patients complained of a peculiar feeling in the back of the head, of dizziness, and many complained of palpitation. If the placenta were an antagonist to the posterior pituitary, and if the posterior pituitary is concerned with the cerebrospinal fluid, and if pituitary over or underactivity increases the tension of the cerebrospinal fluid, then the occipital headaches, stiffness of the neck, pain between the shoulders, and pain radiating down the legs might well be relieved by placental extract. Placental extract, then, in all probability, by affecting osmosis in the membrane of Gley, might relieve this increased tension. The experience noted in this case was duplicated so many times that placental extract was given for these indications.

March 10th. The patient was given suprarenal extract and pituitary anterior.

March 18th. Patient reports that she is feeling fine.

Therapy: Mammary, thymus, and ovarian residue.

June 16th. Has been feeling well. Is awaiting menstrua-

tion in three days. Her legs shake a few days before menstruation and she can scarcely stand. In the last three weeks the last phalanx of her middle finger shows the typical thickening so frequently noted in the climacterium. Blood pressure 150, pulse 72.

Therapy: Placenta and thyroid.

June 16th: Is expecting menstruation in 3 days. Before menstruation her legs are always shaky and she finds it impossible to stand. The patient has a blood pressure of 150 and a pulse of 72. She has been taking mammary extract, thymus, and ovarian residue.

June 18th. During menstruation developed tachycardia 140, proof of the underlying hyperthyroidism.

Therapy: Placental extract plus thyroid 1/6.

June 18th. The patient is menstruating, has felt weak, and has marked palpitation. Her pulse is 140. This patient has been taking placental extract, which made her feel tired and languid and her legs felt as if paralyzed. I have in several instances noted the development of palpitation after the administration of placental extract, which fact suggests that in many cases it stimulates thyroid. At this time thyroid, gr. 1/6, was added to placental extract, and administered shortly before menstruation to determine the nature of the premenstrual shakiness and weakness of the legs. It accentuated the annoyances and developed a tachycardia of the rate of 140, which is quite sufficient to call attention to the adrenal medulla or the thyroid, with the latter as the most probable factor in the production of the premenstrual annoyances.

January 7, 1915.

MRS. H. J.

Five para, last 11 years ago. Menstruation irregular, every 6 weeks to 2 or 3 months.

Last menstruation November 2nd, then December 20th, now bleeds off and on for many days.

Operation for cystocele and rectocele.

October 26, 1918. Gives history of regular menstruation, but stains for a week afterwards.

Therapy: Thymus plus mammary, plus ergotin.

August 1, 1919. Excessive bleeding at menstruation.

Therapy: Mammary extract and pituitary anterior (not obtained at my druggist's).

Curetted in October, 1919, since which time she has taken mammary extract and pituitary anterior.

February 22, 1920. She stopped taking the capsules, and the next day after an amenorrhea of 8 weeks she began to bleed and has spotted ever since up to March 10, 1920.

March 10, 1920. Mammary, plus thymus, plus pituitary anterior are given.

She is a broad shouldered, thick chested patient with pretty face and high color. She is the type which, as I have very often found in previous years in doing my vaginal prolapse operation, has large ovaries with no sign of atrophy. She undoubtedly has, as many of these cases have, an unusually active post. pituitary. I have given her as yet no placental extract since I am desirous of proving if there is value to pituitary anterior as an antagonist to the pituitary post.

February 23, 1920.

MRS. H.

Married 13 years; 0 para; 3 aborts. (self induced).

Operated 7 years ago for rectal itching, hmds. and fistula, and the uterus was curetted.

Menstruation began at 14 years, every 5 weeks.

In the last 7 years has gone 3 months over her period on several occasions without being pregnant.

When she menstruates she stains for 2 weeks and then flows for 2 weeks.

Premenstrual: For the last five years, 1 week before each menstruation she feels "like crazy, is nervous, tosses at night and her rectal itching is worse."

The intervals between her menstruations vary from 2 to 6 weeks.

Examination: Uterus retroverted and enlarged.

Has had frequent cardiac palpitation for the past year.

Masturbated when 5 years. Continued this habit and enjoyed it till married.

Intercourse pleasurable till 2 years ago.

Affectionate, likes children, cries easily.

"Less passionate for 2 years, and has gained considerably in weight."

Diagnosis: Thyroid plus, post. pituitary (unstable), action diminished in the last 2 years.

Therapy: Ovarian extract, plus mammary, plus placental.

The following letter was sent to the physician of this patient referred to me for diagnosis:

Mrs. H.. Fairly tall, broad-shouldered, thick-chested, hair on the forearms, slight mustache, slight beard, broad nose, (but little hands).

This means good anterior pituitary, but no action on hands and feet. Is sensible and a good business woman.

Masturbated and enjoyed it till marriage. Was passionate until two years ago, since which time there is less inclination and she has gained in weight. Is anxious to become pregnant. Menstruation, while irregular, the interval sometimes being as long as six weeks, consists of spotting for two weeks and then a profuse bleeding for two weeks.

She has been manifestly stimulated all her life by the sex elements of the pituitary, adrenal cortex and ovary. Associated with this has been unusual activity of the anterior pituitary. She has been hyperthyroid at times, suffering for one year with palpitation.

In her own words, she feels for the past seven years for a week before each menstruation "like crazy," she is nervous, tosses at night and her rectal itching is worse. A hyperthyroidism and hyperpituitarism is in play during the premenstrual period.

Her ovarian function is partly inhibited by her anterior pituitary and therefore she has at various times gone from six weeks to three months between her menstrual periods.

This patient needs ovarian extract to make her regular, mammary ext. to diminish the amount of bleeding and placental ext. to still further inhibit the posterior lobe.

April 26, 1920.

MRS. H.

Menopause 4 years ago; 1 slight menstruation 7 months ago.

Complaint: Gain in weight, pain in the left shoulder, numbness of the left arm, is nervous, wakes up at night and can't fall asleep again, and feels frightened.

Has cardiac palpitations. Her flushes are not as severe as they were. Patient observes that as her flushes diminished her neuritis began.

Pulse: Erect position 120, reclining 100.

Blood pressure 180.

Therapy: Placenta, ov. residue.

May 5, 1920. Sleeps better, is more quiet, has less palpitation.

Pulse 90, blood pressure 160. Skin feels smoother and more moist as if she had taken thyroid.

May 15, 1920. Feels better in every way. Blood pressure 140.

Therapy: Placental, ov. residue, suprarenal ext.

May 28. Pressure 150 (possibly due to suprarenal).

Therapy: Placenta gr. iii, thyroid g 1/6.

June 23. Placenta.

June 24. Sleeps well, feels well, flushes gone.

October 8, 1915.

MRS. M. L.

Married 14 years; 2 para, 0 abort.

Menstruation regular, but for the last 4 years persists for 10 days. Loses large clots with pain.

Complaint: Menorrhagia, pain in the left side, backache, bladder pressure and nervousness.

Examination: Uterus enlarged and retroverted. Large rectocele.

October 15, 1915. Duhrssen oper. and perineorraphy.

May 25, 1919. Menstruation Q. 3 weeks, large in amount. Indigestion.

Therapy. Ergotin, menthol, sodium bicarb. with very small doses of veronal.

March 23, 1920. Last menstruation November, 1919. Complains of flushes, pain in the right arm. Her neck and back are stiff. She feels worn out, her hands feels numb and cold in the mornings. She voids little and occasionally vomits when the pain in her neck and back become worse. Blood pressure 200.

Therapy: Ovarian extract, plus suprarenal, plus placental.

June 1, 1920. Last menstruation occurs in November, but at the end of April she spotted and stained for 3 weeks. The prescription given on March 23rd was taken for only 1 week as the patient went away on a pleasure trip. Her flushes are not severe, her headaches are somewhat better. She wakes early and cannot fall asleep. She cannot do much. She is tired, "belches for hours" and cries all the time. Her right arm is painful and her fingertips tingle continuously.

Pelvic examination: Normal, blood pressure 190.

Therapy: Placental extract, plus thyroid, plus ovarian residue.

This is another illustration of the varied phenomena occurring at the menopause period. The patient is broad shouldered, thick chested. She has light, fuzzy hair on the cheeks and chin, which I consider as due to the anterior hypothysis in contradiction to the thicker growth, which I refer to the suprarenal cortex. The high blood pressure is an evidence of the overactivity of the posterior pituitary associated with thyroid minus. Hence, the pain and stiffness in the neck and along the spine. The gastric annoyances are probably to be referred to the same etiology. The same cause serves readily to explain the physical and the mental asthenia.

March 6, 1919.

MRS. H.

Married 27 years; 3 para, last 18 years ago; abort. 3 years ago.

Menstruation every 2 weeks with pain for the last 5 months.

Complaint: Menorrhagia and headaches.

Examination: Large fibroid consisting of several tumors, one large immediately underneath the bladder.

Blood pressure 180.

March 12, 1919. Abdominal hysterectomy with retention of ovaries. (?) Appendix, as in all laparotomies, removed.

April 17, 1919. Ovarian extract, plus thyroid, plus suprarenal, as a tonic and to remove the slight flushes.

Therapy: Continued intermittently in May and June. Suprarenal being given with ovarian extract in capsule form.

December 16, 1919. Flushes more marked.

Therapy: Ovarian extract tablets only.

March 12, 1920. Patient comes and wants prescription for the capsules as they "worked better than the tablets."

Therapy: Ovarian extract, plus suprarenal extract, plus placental.

NOTE: The suprarenal extract is given because of the cortex. The placenta is given to overcome the action of the post. pituitary.

March 19, 1919.

MRS. F.

Married 46 years; 7 para., the last 30 years ago; 2 aborts.

Hysterectomy 2 years ago for prolapse of the uterus associated with menorrhagia occurring every 3 weeks.

Complaint: Flushes, indigestion, nervousness.

At that time the symptoms were viewed as a relative Graves' disease after hysterectomy, the type so often observed in the normal climacterium.

Therapy: Corpus luteum.

June 1, 1920. Patient complained of flushing, marked

occipital headaches, pains in the feet, hands, and in innumerable areas of the body. Blood pressure 210. Red line on scratching the skin was immediate and marked.

Therapy: Thyroid and placenta.

June 16th. Pressure 210.

Therapy: Mammary, thymus, placenta, thyroid.

June 30th. Pressure 170.

May 26, 1920.

MRS. A.

Married 21 years; 2 para, the second 14 years ago. No oper., 0 abort.

Menstruation is regular, 6 to 8 days, large in amount, losing large clots for the past 1½ years.

Premenstrual phenomenon, none.

Complaint: Menorrhagia.

The patient has a marked exophthalmos. Flushes easily, and her neck becomes readily scarlet. No goitre. Blood pressure 155, pulse 110.

Her sister, who has long been a patient of mine, suffers from hypothyroidism which, when first seen many years ago, was practically a myxoedema. A brother had Graves disease and died later of pernicious anemia.

June 2. Pressure 140, pulse 104.

The blood pressure makes the overactivity of the adrenal medulla more probable than any hyperthyroidism. This patient has no enlarged thyroid, in fact it seems atrophic.

Cases like this one with exophthalmos, tachycardia and high blood pressure tend to rule out of consideration the role of overactivity of the thyroid in many cases of enlarged thyroid. In other words, enlargement of the thyroid does not necessarily prove it to be overacting even if symptoms of Graves diseases be present.

Diagnosis: Pituitary posterior plus, adrenal medulla plus.

Examination: Fibroid of uterus, larger than a male fist.

Therapy: Mammary extract, plus thymus, plus placental.

July. Tumors practically gone.

October 10, 1919.

MRS. Z.

Married 28 years; multi para. Menstruation now occurs every 2 weeks, associated with pronounced headaches. The menorrhagia and headaches date back 3 years.

Examination: Enlarged, descended uterus, marked cystocele and rectocele.

Vaginal hysterectomy November, 1919; ovaries retained.

May 27th. The patient complains of no flushes as yet. (The ovaries were retained at operation.) She suffers from periodical headaches, occurring at intervals representing the menstrual cycle. Blood pressure 160. Urine normal.

Therapy: Placental extract and thyroid.

In those cases in which the ovaries are retained, in the operation of hysterectomy, a fair proportion develop flushes after a period of several months or years. Some experience the flushes within a short time after operation. I consider the flushes, the headache and the high blood pressure in many of these cases an evidence of overactivity of the posterior pituitary. The development of glycosuria is in many cases to be referred, at least partly, to the same cause.

June 31. Headaches better. Pressure 140, pulse 100.

Therapy: Plac., thyroid, suprarenal. The latter is added because of the rapid pulse.

May 18, 1920.

MISS B.

Patient 49 years of age and unmarried.

The history of her first visit (May 15, 1919) copied from list she handed me, reads as follows:

Eye trouble, hardening of retina, bloodshot.

Nervousness, neuritis, headache.

Rheumatism, arthritis and gout.

High blood pressure, 160 or more.

Hemorrhoids, dizziness.

Poor circulation, cold feet and hot head.

Constipation, weakness in standing.

Dry skin, brittle nails, dry hair, sore throat, mouth, eyes and nose.

May 15, 1919. Her blood pressure was 180. She was given bromides and glonoin and continued under care of the opthalmologist.

Next visit May 6, 1920. Complains in addition of headaches and pain in the fingers and toes. Was bitten by cat a year ago and thinks that is why all symptoms are worse, especially at night.

Blood pressure 220.

Therapy: Placental, thyroid.

May 14. Pressure 160.

Therapy: Placenta g iii, thyroid g 1/6.

May 28. Pressure 160.

Therapy: Placenta, thyroid.

May 27, 1920.

MRS. M.

Married 31 years, 2 para, 1 artificial abort. because of nephritis.

Menstruation began at 13 years.

Always suffered from dysmenorrhea up to year ago, when the menopause was established after a gradually progressive amenorrhea.

Complaint: Flushes and headaches which are occipital, radiating dow nthe neck. Has pains of this sort and likewise "in the face" for 5 years. Notices that her headaches and flushes seem to come at the same time.

Sleeps well but often wakes up with headaches.

Urinates often, but not a large amount. Was operated on 3 years ago for hemorrhoids. She nursed her children for 9 months, having, as she said, "enough milk for 2 babies." She has suffered for years with marked hyperacidity and has been on a selected diet.

Therapy: Ovarian extract plus placental.

May 10, 1920. Flushes have disappeared but above prescription made her "heart burn" worse. Blood pressure 110.

Therapy: Placental, ov. residue.

Headaches and flushes markedly better.

April 28, 1920.

MRS. R. W.

Age 69.

Hysterectomy 4 years ago for total prolapse.

Complains of a dizzy spell 3 weeks ago and notices for the last 3 weeks that her vision is becoming poorer.

Blood pressure 190.

Therapy: Placenta, thyroid.

May 12, 1920. Blood pressure 170, therapy continued.

May 22. Pressure 170.

Therapy: Thyroid, mammary, thymus, placenta.

June 1. Pressure 150, pulse 88.

Therapy: Same.

June 23. Pressure 140. Feels perfectly well.

May 17, 1920.

MRS. W.

Married 15 years, 3 para, last 4 years ago.

Op. 3½ years ago for displacement of uterus.

Menstruation has always been regular, 3 days' duration.

In 1919, amenorrhea once of 3 months' duration.

Last menstruation December, 1919.

Premenstrual phenomena: Headaches, nervousness and irritability.

Sleeps well, has no dreams.

Tired; talking tires her mentally; social affairs which she formerly enjoyed are now a burden. Suffers from indigestion, gas and constipation. Has been told her stomach "has fallen" and wears a special but very uncomfortable abdominal support.

Had all infectious diseases of childhood, including scarlatina, diphtheria and mumps.

For years has had frontal sinus trouble and antrum trouble.

Her headaches which occurred with menstruation are

better for the last 6 months. (Period of present amenorrhea is 5 months.)

As a young girl, was altruistic, and helped the "people in the poor house" of her town.

The husband of an aunt became insane, and no one could manage him but this patient herself. Was religious and thought she ought to do something worth while; became a nurse, but "hated to take money for services."

Though well to do, she started a sanitarium in the country for the care of the mentally affected, in which she takes interest for purely altruistic motives.

Pelvic examination: Uterus slightly larger than normal, both ovaries atrophic.

Patient is of slight build, with no adipose tissue, is thin, has no hair on the arms or legs, has some slight varicosities, some dilated veins on the lower extremities.

She was formerly very thirsty and passed much urine, but was advised to drink less water, and is not annoyed so frequently.

Pulse 72, pressure 125.

Diagnosis: Physical and mental asthenia.

Therapy: Ovarian, thyroid, suprarenal.

May 24. Pressure 110. More nervous. Indigestion better.

Therapy: Placenta, suprarenal, pituitary post.

June 2. Less nervous, stronger. Never felt so well.

Therapy: Same.

May 19, 1920.

MRS. K.

Married 6 years; no para.

March 12, 1918, had a miscarriage at 6½ months; 3 years ago she had a curettage. Her menstruation occurs every 4 weeks to 5 weeks. Patient states that 5 weeks after her miscarriage or premature labor it was discovered that her kidneys were affected and she was confined to bed for three weeks. Subsequently her physician gave her twenty hypodermics,

which she states were corpus luteum, after which she began to suffer from headaches and excessive nervousness. One week before each menstruation she has a peculiar feeling in the head, which she describes as a "dropping in the head like a bunch of pennies shaken in the hand." She wishes to become pregnant, but has taken precautions up to 3 months ago. She is nervous, fearful, has fluhses in the face, terrible headaches at menstruation, and hopes she won't become "crazy." She has dreams which frighten her terribly, and they deal with death, murder and fires. At one time her dreams were so terrible that she was afraid to go to sleep.

Complaint: Pain in the right side; headaches on the top of her head and down her neck, usually occurring a week before and a week after menstruation.

Examination: Pelvic organs normal. Blood pressure 135; pulse 70.

Therapy: Placental extract, grs. 3; thyroid extract, gr. 1/6.

June 4th. Blood pressure 115, pulse 72.

June 11th. Condition the same; note some flushes in the face.

Therapy: Pituitary anterior, gr. ½; suprarenal extract, grs. 2; ovarian extract, grs. 5.

June 12th. Patient feels better, is less fearful, and more confident. Blood pressure 118.

Therapy: Same as above.

MRS. E. K.

Married the first time 11 years ago. Had her only child 10 months after marriage. Nursed for 9 months and did not menstruate. Her husband died a sudden death and the next day her milk stopped, her menstruation came on, she had diarrhoea for several days and cardiac palpitation which persisted for months. Has it now except when she rests frequently.

She married a second time, but separated soon because of incompatability. No abort., no op. Menstruates every 4

weeks for only 2 days, and very little. Ex. shows the uterus to be small and retroverted and was told by a phys. that her retroversion was the responsible factor.

Her premenst. phen. show her to be for a week before menstruation nervous, very sensitive, and she cries easily.

Her blood pressure is 120, pulse slow, perspires readily, has good color and a smooth skin.

She is a singer in a church choir, has a good voice, could readily obtain engagements at concerts and recitals, but unless she rests the day before she lacks the energy to do her work, and unless she rests the day after she is "all in."

When a young girl her mother called her lazy. And she remembers having "no pep," but always looked well. She was a good student, stood among the highest in her class and entered normal college at 16. She wet her bed as a child, was scolded for it by her mother and now, as always, urinates frequently. In this connection she mentioned her boy of 11 years, very bright, full of pep, a leader among the boys, a great reader of books and the soundest sleeper she ever knew, but he still wets the bed.

As a child she remembers having measles and when 5 years old had what she calls pneumonia and was unconscious for 16 days. Has had frequent colds and attacks of grip and influenza.

Volunteered the statement that she wishes to get well for 3 reasons. They are as she stated, first, because of her boy and his future, and her desire to do her duty to him which is her greatest pleasure. Second, she is engaged to a physician now studying abroad, who wishes to marry her, but she feels that she is not well enough. Third, for the sake of her career, since her voice is really a good one.

When asked what interferes with her career, she answered, "I am so tired, I haven't the strength, I cannot get enough sleep." Then she said, when asked if she was blue or depressed, "No; but how is it that I am cheerful in spite of it all?"

Further questioning showed that she and her mother were incompatible; their ideas had always been different; the mother was even now finding fault with the way she was bringing up her boy. Had advised her to send him away to school.

Her maternal instinct is strong; she is affectionate but the sex instinct plays no part in her life.

The action of the hypophysis, thyroid, suprarenal and ovary was explained to her; how she had developed into a tall, broad-shouldered, healthy appearing woman; that she had inherited a fondness for study and a bright mind. That these glands were vulnerable as could be seen from her amenorrhoea during lactation; that they were now underacting on her physical side; that her lack of strength and desire for sleep were the physical expression of this lack as had been the case during her earlier years; that their action on her mentality had been normal since she had been a good student, stood well in her class, was interested in the education of her boy, and had ambitions for her future. That they had acted normally in conjunction with her inherited instincts and emotions; that her whole life and her unfortunate marital experience had still left her with a pleasant, open mind, susceptible to encouragement, and that the understanding of her condition would show her that her lack of energy and of physical power to do were not lack of control of mind over matter or her body, but lack of stimulation of certain body functions through instability of certain endocrine elements. That though she had courage she lacked physical strength. That her thyroid was unstable, overacting at times or in certain phases as was shown by her diarrhoea, her palpitation, etc., and that this, with adrenal medulla overaction, could make her feel tired just as well as an underaction could fail to furnish energy.

Was given ov. extract plus suprarenal. Thyroid was given to test her hyperthyroidism which has probably been the basic factor throughout her life.

Thyroid proved her to be hyperthyroid.

Improvement resulted from suprarenal extract and hypodermics of adrenal cortex.

December 3, 1919.

MRS. S.

Married 7 months; no precautions; menstruation regular, duration 1 week.

Complaint: Pain on the left side, worse at menstruation.

Examination: Retroversion, cystic left ovary.

Therapy: Ovarian extract and thyroid.

March 18, 1920. Has taken the prescription for 3 months; is not pregnant; partner has not been examined. Has a suggestion of moustache, and hair in sciatic region. Is "afraid" and nervous and "imagines lots of things." Is this way only since marriage, since when she has lost 40 pounds. Sleeps poorly, dreams every night of horrid things, wakes up and "shakes." Dreams of dark things and dark people. As a child was always afraid of the dark; would not walk into a room alone. Is frigid, but just before and during menstruation has libido. Has a poor appetite and frontal headaches. Passes little urine.

Looks like too much pituitary post., and too little anterior and suprarenal cortex.

Therapy: Placental extract, plus residue, plus suprarenal.

MISS C.

My Dear Dr. S.:

I saw Miss C. My diagnosis of her case is one of hyperpituitarism, posterior lobe, and I will tell you why I think so, because some day I wish to talk this and other cases over with you. She has none of the signs of an overactive anterior hypophysis nor of an overactive adrenal. She is distinctly hyperthyroid or hyperpituitary or both. She menstruates regularly, has an elongated uterus, menstruates for three days, but stains off and on for a week. While not suffering from dysmenorrhea she has had three attacks of pain during menstruation.

Her premenstrual phenomena are swelling of the breasts, she becomes excitable, cries three or four days before each menstruation and describes these symptoms as "emotional." She

was called hysterical as a girl. Each year she entered school and did her work with enthusiasm and energy, but toward the end of each school year would have to be taken out and given some sort of a rest or relaxation because she worked so hard. She is engaged to be married. At the present time sees her fiancé every week and describes her instincts and emotions by the word passionate. She knows enough about the theory of Freud to be moved by the fear that these reactions are immoral and not normal.

Now, I believe that a girl who is hyperthyroid, and especially one who is hyperpituitary, with a consequent stimulation by the latter, exerted trophically on the uterus and the sex sphere, has its parallel in the stimulation of the cerebral activities, phantasies and thoughts of a sex quality. I do not believe that it is necessary for one factor to be responsible for the other, but that both appear more prominently in the individual whose posterior pituitary is active. It is these factors plus the absence of many of the physical phenomena of hyperthyroidism that have led me to make the distinction between the excitability of hyperthyroidism, and its flow of language and thought, and the cases of hyperpituitarism. So far as I can judge, the above explanation is much more satisfying and adds much more to the respect with which a patient views herself when such an explanation as I have given is made that when the theory of Freud is invoked. In other words, this girl has had a sex urge, of course accentuated by her love affair and by her engagement, because she has an overstimulating posterior pituitary; and the so-called hysterical manifestations recall the origin of the word hysteria taken from the Greek word meaning uterus which shows that the old Greeks realized as well as we do now that in hysteria there is an impulse of sex which they traced back to the uterus, but which we may some day trace back to a gland located in the brain which acts trophically and in a stimulating manner on the uterus; but which by the very fact of its location, in the brain, should of necessity be associated in a trophic manner

with cerebral activity and the sex side of our mentality and consciousness.

I explained to Miss C. this physical side of her condition and it certainly gave her great relief as you may well understand. Now whether this idea be correct or no, I wish you would give it some thought and give me the benefit of your opinion.

With very kindest regards,

Yours very sincerely,

S. W. Bandler.

January 29, 1920.

MRS. B.

Forty-eight years old. Married 30 years; 5 para., the last 17 years ago; no operation.

Menstruation regular, 4 to 5 days, large in amount for the last few years.

Complaint: Pain in the left side, a sense of dropping down. Urinates very often.

As I first saw the patient she looked tired, quiet, depressed, heavy eyed, and cerebrally myxoedematous.

She has headaches in the back of her head, radiating down the neck and behind the ears. She flushes readily and red spots appear on the nose and face. She does not sleep well, since she wakes up early. When she wakes up she feels blue and this has continued for two years. She feels worried, but is not frightened.

Examination: Cystocele, rectocele, descensus uteri. Blood pressure 160.

Diagnosis: Post. pituitary plus, thyroid minus.

Therapy: Ovarian extract, plus thyroid, plus placental extract.

October 16, 1915.

MRS. Sp.

Married 3 months. Menstruation regular. Last menstruation June 21, 1915. Married June 22, 1915.

Diagnosis: Pregnancy.

Delivery: Normal.

Some time subsequently the patient became pregnant again. She came to me and said she thought it was too soon after her first delivery. I advised her strongly against any interference. She, however, found a receptive mind in the person of a physician who told her that she was not pregnant but that she needed a cervical operation. She came to me on May 21, 1917, no longer pregnant, feeling weak and tired, blood pressure 120, pulse slow.

Therapy: Pituitary extract whole gland, plus thyroid, plus Blaud's mass, plus arsenious acid, and in three weeks she came and said she felt wonderful and looked it.

In 1918 she menstruated on January 5th for the last time and when she came to me she was pregnant. She visited me every two weeks and was one of the quietest patients I have ever had. She would come into the office, nod to the nurse and to me, be examined, take advice, and leave without a word. Her demeanor, which was not one of depression, was a subject of remark. The morning of her expected date she telephoned that she was having pains, ordered a taxicab to go to the hospital and I awaited word of her arrival. An hour and a half afterwards I was called suddenly to the house, found her in bed with her coat, shoes and clothes on, and the baby already born. Her husband had been unable to get a taxi and she had this precipitate labor. This is quite enough to make the diagnosis of post. pituitary hyperactivity.

She was not excited, did not seem to be frightened, but was decidedly apathetic.

Within the next few days she began to complain about the nurse, refused to take food from her, insisted upon having the baby in her sight all the time, would take no food but that prepared by her mother, told me of all the plotting there was against her life, even became suspicious of me, became violent and developed what we have called "a post partum mania." A psychiatrist was called in consultation and she was removed to a sanatorium.

March 19, 1920. This is the first time I have seen the patient since she went to the sanatorium, though she has been home several weeks. She states that she has menstruated for 2 weeks. Her eyes are somewhat prominent, but were always so. She has now no premenstrual phenomena. She flushes easily, is easily frightened and states that dreams frighten her.

Examination: Her uterus is normal; her left ovary is markedly cystic with irregular nodules distinctly felt.

She volunteered, of her own accord, the following statements about the sanatorium: She said she had a bad time while there, that they put her in a straight-jacket every night, and that she cannot get the straight-jacket and the two physicians out of her mind. She states that she had a sleeping potion every evening. She is sure from the way she felt when she got up that someone slept with her every night. I asked her how that could be since she had a night nurse, but she said that didn't matter.

Therapy: Residue, plus suprarenal, plus placental.

Diagnosis: Psychosis, at the bottom of which is a thyroid plus, adrenal medulla plus, and pituitary post. plus.

The patient, as her family state, is now a great burden. She takes little, if any, interest in the children, cares nothing for her home life, and is totally different from the quiet, domestic type which she formerly represented. She goes out to dances, is by no means particular in the choice of her male companions, and is continually looking for and craving excitement.

It could be well stated that this patient represents a point only half way back to the normal from her state of acute psychosis. This half way state, as we might call it, depicts a type by no means uncommon, especially at the present time. There are many individuals of the mental and pschycic state now represented by the patient's present behavior, many of whom may at a subsequent period go on to a condition represented by this patient when at her worst.

The precipitate labor means to me a marked overactivity of the posterior pituitary. I consider this psychosis a pituitary

anomaly and the history as well as the patient's delusions and hallucinations, which were distinctly of a sex nature, point to this important cerebral endocrine structure as the cause of her post partum mania and her subsequent symptomatology.

October 21, 1916.

MRS. H.

Operated for right ovarian cyst size of 4 months' pregnancy.

March 5, 1920. Soreness of the right side, pains in the back of her head and neck, morbid and depressed, sleepless, takes long to fall asleep.

Has one child; maternal instinct marked, extremely fond of children; good sex instinct. Good color; blushes and flushes readily.

Examination: O. K.

Diagnosis: Post. pituitary excess and adrenal medulla excess.

Therapy: Anterior pituitary plus placenta. (Should add cortex.)

Post. pituitary overactivity is, I believe, closely related to production of ovarian tumors, uterine adenoids, and fibromyomata.

May 1, 1920.

MRS. O.

Married 11 years; 2 para, the second 2½ years ago. Nursed 2 months, with amenorrhea for 3 months.

Menstruation Q. 24 days, duration 5 days.

Premenstrual phenomena, nausea.

Complaint: Is nervous, fearful, has headaches occipital, and over the right eye. These are worse at menstruation.

Examination: Small uterus, cystocele and rectocele.

The patient is not tall, but is broad and thick chested; is plump and has a beautiful complexion. Has a slight mustache. Resembles markedly a patient of mine, whose condition is considered to be due to the adrenal cortex. The question is

whether we are dealing with adrenal or pineal adiposity. The condition which prompts the headaches, nervousness and fear is viewed by me as posterior pituitary, whether or no the pineal is likewise involved. The therapy advised to her physician, with whom she was seen, is mammary extract plus thymus, because of her 24 day menstruation. To this was added ovarian residue and pineal gland. The patient is anxious to conceive.

April 27, 1920.

MRS. A.

Married seven and a half years, no para.

Menstruation began at 14 years; occurred every 6 to 8 months.

It then became regular till she was 18 years of age, when she would bleed twice a month.

Since her marriage she menstruates every 5 weeks, but for one day only.

She skipped her menstruation in December.

Had measles at 7 years, pleurisy 3 years ago, influenza 2 years ago.

Complaint: Pain in the right side for a year and a half; headache.

Premenstrual: One week fullness of the breasts, pain in the right side, irritable.

She is always afraid, especially since the death of her mother, when the patient was 13 years old. She wakes up at night and is afraid something is going to happen.

Libido marked up to a month ago.

Examination: Corpus luteum cyst of the right ovary.

Blood pressure 100, pulse 90.

Therapy: Suprarenal.

May 4, 1920. Pressure 100, pulse 80.

Therapy: Ovarian, ov. residue, thyroid, suprarenal.

May 12, 1920. Feels much better, therapy continued.

March 17, 1920.

M. B.

Married 7 years; 0 para; 0 abort.; 0 op.

Eight years ago hurt her back with a fall and since then menstruates every 3 weeks. Menstruation began at 11 years; is now regular every 3 weeks, lasting a week.

Had pneumonia three time. Fifteen, ten and three years ago. "Had influenza every year." Had mumps and chicken-pox as a child and two years ago had measles. Her brother had pneumonia twice. Her father, who was a physician, died of "septic poisoning" after demonstrating at a hospital on a dead body.

Has psoriasis every since she began to menstruate. She formerly had headaches in the back of her head, radiating down her neck and behind her ears.

Has a husky voice resembling that of people who are hard of hearing, so that I spoke loudly to her until I asked her about her hearing. She said it was normal. She blushes and flushes easily and looks like another patient of mine (in fact she looks enough like her to be her sister), in whom fears and phobias are the predominant symptom. Some days she passes much urine, some days little.

Complaint: Extremely nervous for 3 months.

Premenstrual phenomena: "Always feels extra fine before she bleeds."

She "spots" off and on. She is "afraid" and despondent; "time hangs heavy on her hands"; her eyes are prominent; she is constipated.

Examination: Uterus enlarged. Contains a fibroid nodule.

Therapy: Ovarian residue, plus suprarenal, plus placental.

May 15, 1920.

MRS. B.

Married 10 years, 0 para, 0 abort, op. 14 months ago, dilatation of cervix, removal cystic right ovary, removal appendix.

Menstruation began at 13 years, regular, 3 days' dura-

tion, accompanied by dysmenorrhea, which improved after marriage.

Premenstrual phenomena as a girl lasted a week, consisting of pain, depression and weakness.

Now feels better and stronger one week before menstruation than at any other time.

Menstruation for the last 6 years lasts only one day. In the last 4 years has gained 20 pounds.

As a girl was healthy and well, stopped school at 16, but continued with her music, her ambition being to become a singer, which wish, because of her illness, has never been gratified.

Has had chickenpox, measles and mumps.

Twelve years ago she noticed the first change. Her mother had been ill for a year in a hospital and she was untiring in her attentions. She was going home on the elevated train and was suddenly afraid that she was going to do something to herself. When she reached home her menstruation had begun.

When in the company of people she has a feeling as if her throat was tightly closed.

The presence of strangers brings on and accentuates this annoyance and she has a "hard time breathing." She cannot go to the cinema or theatre and cannot be alone because of the physical fear, that is, the fear that she might die in one of these attacks. Has no other phobias.

A brother is at Saranac because of pulmonary tuberculosis.

She is tall, well built. For the last 4 years has acne on the chin, the acne dating almost from the time her menstruation became less.

Is an excellent talker and her memory is perfect.

Irritation of the skin causes a white line and then a very slow but marked red line. There is no blushing. Has marked varicose veins in both popliteal spaces.

Pulse 80, pressure 125.

Pelvic examination: Very small atrophic uterus.

Therapy: Placental, ovarian residue. Slow, steady improvement. Patient and husband comment on the change.

April 23, 1920.

MRS. C. V.

Married 8 years; 2 para., the last 3 years ago; nursed for 3 months.

Menstruation regular, 5 days' duration. For the past few months loses more blood and now has been spotting for ten days.

Severe headache.

One month ago severe occipital headache.

One week ago severe occipital headache, pain between the shoulders and pain running down the back of the legs.

Diphtheria seven years ago; treated by anti-toxin; was in bed for 5 months with extremely rapid pulse.

Examination. Retro version; lacerated cervix.

She is nervous, "on edge," doesn't know what to do with herself, "feels like running away."

Blood pressure 170; pulse 115 when sitting up; 105 when lying down.

Diagnosis: Involvement of the adrenals and posterior pituitary; in other words, posterior pituitary plus.

Therapy: Mammary, thymus and placenta.

April 30, 1920. Blood pressure 130, since taking prescription. Headache and pains have disappeared and she feels like a different person. Though rarely having dreams, she has during the week dreamed of holdups, robbers and intoxicated people, etc.

May 7. Tired, sleepy.

May 14. Pressure 120, pulse 90.

Therapy: Placenta, thyroid, suprarenal.

May 21. Pressure 120, pulse 100.

May 28. Mammary, thymus and placenta. Feels perfectly well. Pressure 110.

MRS. G.

May 24, 1920. Last menstruation February 14th. Has had 2 children, one in 1912, one in 1918.

First was lost when 1½ years old, with an unusual cerebral condition diagnosed as meningitis, after an illness of several weeks.

The second baby, likewise a girl, blue eyed and with reddish hair, was diagnosed when 7 months of age as a case of amaurotic family idiocy. This child lingered until the end of May, 1920.

The patient's husband lost his father of "Bright's disease" at the age of 60. His mother died of Carcinoma of the rectum at the age of 60. A brother died of typhoid. A sister, who is a patient of mine, has reddish hair and blue eyes and is, though apparently normal, mentally and physically peculiar.

The patient (Mrs. G.) has sandy hair and gray eyes, wonderfully smooth skin, without the faintest suggestion of trichosis.

Her father has dark eyes, the mother has hazel gray eyes.

A brother of the patient is blond with blue eyes. One sister is dark, with black eyes, and considerable trichosis. Another sister is dark, with black eyes, and is markedly a case of hypertrichosis.

The patient, with her coloring, is not at all unlike the peculiar sister of the husband.

The amaurotic baby, in my opinion, was characterized by a lack of the endocrines supplying pigments, which factor could readily explain the conditions of sight and cerebral maldevelopment.

The patient has blood pressure of 110, and pulse of 100, and will be given during this pregnancy suprarenal extract and pituitary anterior, in other words, two of the important so-called male glands. The theory in this case instances the line along which unsolved problems of medicine must be approached. If the new baby is a boy or inherits the dark suprarenal cortex character of the maternal grandfather, it is probable that all will be well. If, however, the expected off-

spring is of the type of the other two children, suprarenal cortex and pituitary anterior will be administered continually from the day of birth. Aside from the above mentioned extracts, extract from the cells of Leydig and of the interstitial portion of the ovary are to be taken into consideration. These four extracts will be administered to the expectant mother during the whole period of her pregnancy.

The element of heredity with its associated gland activities plays an important part in determining the type of child born. Many women, who eat much, have small babies, and many who eat little, have large babies. Babies of big, bony framework, well covered with muscular tissues, are the products not of the food which the mother eats, but of their inherent endocrine activities, such as the hypophysis, etc. I recently confined a patient whose newly born infant was one of the lustiest and pinkest I have ever seen. The delivery was perfectly normal. Yet half an hour after birth the baby had the most typical attack of tetany, which lasted for an hour, gradually growing less, and entirely fading away in the course of 24 hours. The baby is perfectly normal. In neither side of the family did I elicit a history bearing directly on the etiology, yet I know enough of the ancestry to recognize the existence of thyroid and of pituitary anomalies. The baby's mother, for the last 10 weeks of her pregnancy, was in bed with a grippe cold. In view of a probable parathyroid etiology of tetany, and the recorded observations as to the relations of this condition to the subsequent development of nervous manifestations, among them chorea and epilepsy, any observation of this sort is of the greatest importance. Had this baby been put into its little basket, and had no attention been paid to it for the first hour and a half after delivery, the tetany would have escaped notice, as the typical movements of the arms, the mouth and the larynx diminished quickly.

MRS. P.

September 14, 1914. Two para, the last 7 months ago. Nursed for 6 months.

Menstruation regular, but lasts 8 days.

Complaint: Backache, headaches, nervousness, pain on the left side under the lowest costal cartilages.

Uterus enlarged, hard, irregular, containing several small fibroids. Ovaries cystic.

Operation, Curettage; Laparatomy, uterine suspension, resection half of each ovary.

May 17, 1920. A drawing feeling under the left rib. Sleeps poorly, has frontal headaches, stiffness of the neck. Has just lost 2 aunts; one died of carcinoma, the other of heart trouble. She is frightened, having heard so much about cancer.

Examination: No abnormality. Blood pressure 110, pulse 88.

Therapy: Placental extract and ovarian extract.

May 24, 1920. Sleeps much better and feels languid. Her menstruation came on 4 days ahead of time, probably because of the ovarian extract. Pressure 110, pulse 72.

Therapy: Placental extract and suprarenal.

June 1, 1920. Has slept much better; feels sleepy all the time. Pressure 100, pulse 88.

The effect of the placental extract in this, as in many other cases, is to promote sleep and create a feeling of languor, which I take to be one of the many evidences of its action in antagonizing probably the adrenal medulla, but much more specifically the posterior pituitary. The posterior pituitary activity in this patient, as in innumerable others, is not associated with high blood pressure because the thyroid is not minus. This gives an indication as to therapy and for that reason thyroid was not administered in this case. Patient feels better physically and mentally. It is not to be doubted that the physical and pelvic examination, with the assurance that all was normal, had much to do with calming the patient and removing her fears.

MRS. A. V.

November 15, 1917. One para, 21 years ago; 0 abort., 0 op.

Menstruation Q. 26 days, large amount, no pain.

Complaint: Menorrhagia.

Examination: Enlarged uterus, hypertrophy of cervix. Diagnosis, fibrosis uteri.

Therapy: Ergotin 2 grs., stypticin gr. 1½ in capsule form 3 times a day.

September 27, 1918. Complaint: Menorrhagia and asthenia.

Therapy: Ergotin, extract of nux vomica and quinine hydro-bromide.

March 4, 1920. Complains of menorrhagia and marked asthenia.

Examination: Large uterus, hypertrophy of cervix.

Therapy: Ovarian extract, plus thyroid, plus mammary, plus suprarenal.

Last menstruation April 22nd.

June 1. Patient feels better in every way, has gained in weight, and wonders if she is gravid.

Examination: Small uterus and cervix, at least 1/3 less than normal uterus and certainly 1/4 the size of the uterus when examined on March 4, 1920. There are no flushes and it is probable that as a result of the therapy the mammary extract and the suprarenal and the thyroid have resulted in a marked involution such as should normally take place in a patient in the late forties.

The ovarian extract and the thyroid were overcome in their uterine nutritional functions by the suprarenal extract and especially by the mammary.

MRS. L.

A patient pregnant in the ninth month had a slight influenza. A week after recovering from her slight influenza, she came to me and immediately began to cry. She said she was irritable, restless, could scarcely sit down, felt the impulse

to be continually on the move, felt frightened and knew there must be something the matter with her, because she had never felt like this before and wished she could have her baby right away. Knowing her for two years or more and having confined her with her second baby, and seeing her before and after labor and under all conditions, I knew her to be a very sensible wife, mother and patient. It was apparent at a glance that she had a slight thyroiditis among her other gland involvements, and that the adrenals and pituitary were disturbed. She had a rapid pulse, and was for the time being a case of hyperthyroidism with psychic irritation. (Ov. Ext. and suprarenal extract were given.)

We know that during pregnancy there is increased glandular activity of the anterior hypophysis; we know that the suprarenal glands and the thyroid especially, and probably all the other endocrines, are working with increased energy. It can be readily realized that pregnant women are, therefore, more subject perhaps to injury of one or more of the endocrines than are the non-pregnant. They recover more slowly from the cough and the bronchial irritation of the present epidemic (1920). In the epidemic of 1918-1919, the mortality in pregnant women was very great, probably because the endocrines of the pregnant woman, working over-actively through the stimulation of pregnancy, are more readily devitalized by the toxins of influenza. She improved slowly but steadily and was well before full term.

I confined this patient subsequently and she is now perfectly normal.

MRS. M.

The moment the patient entered the office with her husband I said, "How long has your neck been so large?" The thyroid was transversely and evenly enlarged. She answered, "That's what brought me here."

Md. 3½ years, 1 para, 2½ years ago. Nursed 15 months and for the first 6 months of nursing she did not menstruate.

Menstruation every 5 weeks, 8 days' duration. Last

menstruation November 28th, 1919, and is now pregnant again.

When 6 months pregnant with her first baby, she observed cardiac palpitation; which became worse after the birth of her baby.

Since she became pregnant the second time the thyroid has enlarged still more and she has attacks of palpitation, lasting for hours, during which time she is frightened and demands the presence of her physician for hours.

As I take her history she talks continuously and I can scarcely stop her to take the history; she insists on telling me what other physicians have told her and is scarcely able to sit quiet or to be composed.

Note: Since the anterior pituitary is stimulated during pregnancy the thyroid is probably stimulated to a development of its interstitial tissue.

Therapy: Pituitary post. plus placenta, plus ovarian residue.

March 10th, 1920. Thyroid noticeably smaller and softer; patient quiet and composed; blood pressure 90.

Note: High blood pressure is often associated with thyroid minus. Thyroid minus is responsible for kidney conditions simulating nephritis. Hence for years I have given thyroid extract for pregnancy kidney, and for pre-eclamptic symptoms. Patient was assured that thyroid plus was much more helpful to her than thyroid minus. Undoubtedly the condition of thyroid minus as is to be noted in the history of Mrs. K. (p. 436) represents the opposite state to this patient's condition

She is remarkably improved. Thorough explanations of the condition was an important part of the therapy.

MRS. MacD.

This patient came to me when four months pregnant. She was of an excitable, joyous and rather jerky nature, with a very settled sound-minded understanding husband. A week later, while standing beside her automobile on a country road, because of a blow-out, there was a loud screeching, grinding

noise caused by an automobile which came suddenly and at rapid speed around a by-road a few yards away. The automobile turned into the main road at rapid speed, and the patient standing by the rear mud-guard, with marked presence of mind, pushed her body and abdomen against her automobile while the guard of the onrushing machine scraped and pushed her thighs and buttocks against her own car. When I saw her she was rather upset by her experience, her sciatic region and buttocks were black and blue. She was kept in bed for several days with sedatives and no ontoward result, so far as her pregnancy was concerned, developed. During labor her membranes ruptured before full dilatation. She was delivered of a nine-pound boy.

She was exceedingly fearful concerning the child, insisted on its being by her bedside all the time, and wanted it in her own bed continually. She was rather critical of the nurse, who was exceedingly capable. Her nipples were retracted and the milk was extracted by pump and given to the baby, which thrived very well. She was given suprarenal extract with anterior pituitary; there was quite a noticeable immediate improvement in every way; her fears and suspicions rapidly disappeared.

MRS. L.

When this patient came to me I saw that she was nervous and fearful. I explained to her that she should, during her pregnancy, not listen to any of the numerous and foolish things that she would hear from other women, that everything was normal, and that any explanation that she desired would be gladly given by me. I saw her as I see all pregnant patients, every two weeks, and it was a continued struggle on my part to remove from her mind the strangest notions concerning prenatal influence. As her husband said, "She ate up everything she heard." During the last three months a favorite sister of hers, who had previously been operated on for a carcinoma of the coecum, was seized with an intestinal obstruction and shortly after died. Two weeks before the ex-

pected date, realizing the patient's condition of fear and fright, I sent her to the obstetric sanitarium in charge of a nurse to remove her from the surroundings and the people whose influence I felt was injurious. She was exceedingly hard to quiet. When she went into labor she was frightened, said she knew she was going to die and talked continually of her sister. Her membranes ruptured before pains began and the dry labor was, of course, rather long. I felt that the loss of her baby would be followed by a psychosis and I carried her along with small doses of pituitrin, and toward the end, I anesthetized her by chloroform, split the perineum and delivered her safely. She was watchful of the baby, insisted on its being near her all the time, watched the nurse in every manipulation, complained that she was not holding the baby's head in the right position. Although the day nurse was exceedingly capable, I changed nurses and explained to the new one the patient's condition; that she was bordering on a psychosis and that she should be exceedingly yielding in everything that the patient asked. I told the patient that she would be asked to nurse the baby for only two weeks in order to get the uterus back to normal condition, and, thereafter, the baby would be put on the bottle. I gave the patient suprarenal extract, grains 2, plus anterior pituitary, grains 2, three times a day. At the end of two weeks I turned the baby over to the paediatrist. In the meantime, though I had explained my reasons to the patient's husband, and particularly to her mother, they had, without my knowledge, told her that she was selfish in not wishing to nurse and the mother said it was a gross injustice to the baby. This was a case of thyroid, adrenal (medulla), posterior pituitary over-activity with a minus of the adrenal cortex and anterior pituitary.

I questioned the mother at one time as to her daughter's condition when a child. She answered that she was quite normal. I said, "Wasn't she rather nervous and afraid as a child?" and she replied, "Oh, yes, when Mrs. L. was a little girl about five, whenever she heard a band of music she would run into the house in terror and either stay with me or hide

herself." The patient has a stubborn, inconsiderate husband. The psychic irritation is profound.

MRS. G.

Patient was married on January 30th, 1917. On February 21st, 1917, she menstruated for one day. On March 20th, 1917, she menstruated for one day, and stated that her sisters all stained for one day even when pregnant. The patient expected to be delivered on November 10th, 1917, but was delivered in December, 1917. She felt life on July 12th, 1917.

I saw her first on September 21st, 1917, because her home was in Virginia and after she came to New York she was referred to me. She returned home four weeks after the delivery and contrary to my advice nursed her baby for eleven months, during which time she did not menstruate. She then returned to New York and her mother sent for me. The patient was in bed, pale, tired, languid, almost in a state of amentia, frightened, stated that she was losing her mind and fearful concerning every detail of her life. She was told that her condition was the direct result of her prolonged lactation, that in giving the breast to the baby for such a long period she had deprived herself not only of nourishment needed for her own system, but had been sucked dry of the endocrine elements essential to her welfare. She was given a prescription consisting of suprarenal extract, grains 2, thyroid extract, grains 1/10, and pituitary extract whole gland, 5 grains T.I.D. The baby was at once put on the bottle and in two weeks there was a complete transformation, both physical and mental, and in six weeks she was entirely restored to her normal state of health.

One hears frequently of the inability of the modern generation to nurse babies at the breast. Whatever the causes may be, and I think I know the reasons for this inability, it is quite certain that in my practice at least, only a few of the mothers should nurse the babies without the aid of endocrine stimulation, and this endocrine therapy is not administered to improve the amount or quality of the milk, for plenty of the

mothers have milk of a quantity and quality sufficient to cause an increase in the baby's weight of from 5 to 12 ounces per week. This much I do know about lactation, that in many of these cases the mothers are drained of their endocrine reserve and the strain on the adrenals is not the least of the injurious effects. It is a constant battle between me and the paediatrician. He naturally thinks only of the baby. It is gaining in weight, and he sees no reason for prescribing a formula. But I, who am supposed to have the interests of the mother at heart, feel that in many cases we are doing great harm to the reserve energy of the mother, and the stand which I take against prolonged or unaided nursing is in many cases positive. Then again comes the battle with the patient's mother or mother-in-law or relatives who, because they nursed several children in their day, see no reason why the attending obstetrician should advise otherwise.

MRS. M.

I confined a patient in a hospital at two o'clock in the morning. At seven there was a fire in a closet containing drugs, and her room and the corridors were filled with smoke. The nurse was out of the room at the moment, the patient groped her way to the crib, took her babe in her arms and walked up four flights of stairs. When I saw her after she had been put to bed in another room, she was *not frightened* but was angry and was complaining of what she called "the poor management" of the institution.

Had her adrenal and pituitary function been minus, she would have lost her head, would have shown the physical manifestations of fear, would have become as it is called "hysterical," etc. Having, however, a good adrenal response (both medullary and cortical) she was self-possessed and able to do the right thing. Her maternal instinct played an important part in producing this response which shows that her posterior pituitary also acted when called upon. The associated action of the anterior pituitary was responsible for the judgment displayed under unusually trying conditions.

The self-possessed person is one whose endocrine mechanism needed at the moment or for a definite purpose is stable and intact without interference by or without excitation of associated reactions able to block or to interfere with or complicate the co-ordinate mechanism supposed to play the important part or role correctly.

Any deviation from this by what are known as conflicting emotions means that under certain circumstances self-possession is lost. This gives rise to conditions familiarly known as "loss of control," "becoming rattled," "stage fright," "giving one's self away."

Now this patient was taken home in an ambulance, thus removing her from the surroundings associated with the experience. She was told to think of it as a wonderful proof of her nerve and courage and to realize that she should be most grateful for the favorable outcome and not spoil her breast milk by anything that would repress her happiness and general sense of well-being.

She has not shown the faintest unfavorable reaction, is quite proud of the compliments showered on her by her friends and family and has shown such a marked "nerve and endocrine stability" that the man may be considered fortunate who, twenty years hence, marries the little baby daughter whom I brought into the world. For such an endocrine heredity as is this baby's is not to be lightly viewed.

MRS. W.

Pregnant three and a half months, not nauseated, somewhat sleepy. Had a grip cold and was treated by a physician who after four days said she was alright. Three days later when Dr. T. was called in he found her mentally irrational, passing eight to twelve ounces of urine a day with a temperature of 101½. The urine contained alb. and casts. He gave her acetate of potash and colonic irrigations of sodium bicarb. and the urine went up to thirty-six ounces. When I saw her her knee-jerk was exaggerated, her blood pressure was 110, she answered all questions, had no facial, tongue or hand

paralysis or paresis, but was sleepy and drowsy. My diagnosis was acute nephritis with intracerebral pressure and hypothyroidism, because of the slow pulse.

When first seen she was passing only ten or twelve ounces of urine a day containing alb. and casts. In this patient we see as the result of influenza a kidney condition parallel to many of the pre-eclamptic and eclamptic cases, except that the blood pressure was low. In the pre-eclamptic state blood pressure is high because of posterior pituitary overactivity. In this case involvement of the pituitary (the slightest form of encephalitis lethargica) resulted in a posterior pituitary minus. In eclamptic cases the important conditions are post. pituitary excess and thyroid minus. This patient improved and became normal on a quarter of a grain of thyroid three times a day and on the bicarb. and glucose Murphy drip.

MRS. L.

Had her first baby and a few days after developed a grip cold which I think she also had before her labor. I saw her with Dr. B. She developed a puerperal mania and was restrained with difficulty. The doctor gave her morphine and hyoscine. Blood pressure normal, pulse above normal. No paralysis or paresis but the knee-jerks were below normal.

She answered everything I asked her. Her memory for every detail was excellent and she said she thought that she had wet the bed, on which point she seemed to harp continually. She thought she was "drunk from the cognac which the doctor gave her for her cold" and so explained the enuresis. She talked continually and then came to the question of her former physician, on which she harped most continually, calling me back several times to tell me more details of his neglect and his refusal to go to the Bronx. She simply could not stop talking; wanted her baby near her or in bed. My diagnosis was hyperthyroid intoxication,—thyroiditis.

Therapy: Ovarian extract and suprarenal extract.

Result—Rapid recovery.

May 21, 1919.

MRS. G.

Married 27 years; 1 para 26 years ago; 1 abort. 23 years ago.

Appendix removed 4 years ago.

Menstruation regular, 2 days' duration, no pain.

Premenstrual: (1 week) breasts, draggy feeling, depression.

Complaint: Pain in the right side, backache, a sense of "dropping down," dreams much.

Examination: Possible adhesions about the uterus, small fibroid in the fundus.

Therapy: Mammary extract, plus ergotin, plus pyramidom.

September 6, 1919. Polyp of the cervix, projecting into the vagina and not seen before.

NOTE: Probably forced out by mammary extract and ergotin.

December 16, 1919. Polyp protrudes from the cervix more than in September.

February 9, 1920. Placental extract given.

February 25, 1920. Feels tired and polyp removed in my surgery. Placental extract continued.

March 10, 1920. Feels tired and languid (effect of placental extract), legs feel like paralyzed.

March 10, 1920. Therapy: Suprarenal extract, plus pituitary anterior, plus thyroid.

June. Thyroid has twice increased the premenstrual shakiness and has caused tachycardia.

September 24, 1917.

MRS. E.

Married one and a half years, 0 para.

Menstruation regular, duration 10 days.

Complaint: Menorrhagia, leucorrhea and pain in the pelvis.

Examination: Enlarged uterus, hypertrophy of cervix.

Therapy: Thymus, mammary, ergotin; douches.

September, 1918, had a severe attack of ureteral colic.

May 12, 1920. Menstruation regular, duration 1 week, losing considerable blood. Has pain in the left side and headaches at menstruation.

Vaginal examination permits the palpitation of the left ureter which in the region of the bladder is somewhat thickened and very sensitive. The uterus is enlarged but freely movable.

Therapy: Mammary, thymus, placental.

May 26. Mammary, thymus, placental, ant. pituitary. Feels better; looks well.

February 25, 1920.

MRS. I. R.

Married 3 years; 0 para; 0 abort.; 0 op.

Menstruation regular, 3 days' duration; pain every other month.

Premenstrual: (1 day) languid and irritable.

Complaint: Why not gravid?

Has asthma since marriage and has it when she catches cold.

Menstruated profusely before marriage; since marriage menstruates less and has gained 25 pounds.

Examination: Small uterus, pin hole os, retroflexion.

One year ago was given by her physician, whose wife while under my care became pregnant under endocrine therapy, corpus luteum and thyroid. Patient states that asthma came on after taking those capsules.

My therapy: Ovarian extract, plus thyroid, plus post. pituitary.

March 7, 1920. I received the following letter: "I am feeling fine. The medicine hasn't affected me at all. I have taken all the capsules. My appetite seems to be better than ever. I havn't had any colds nor heavy breathing since I have seen you."

INDEX

Abortion, endocrine therapy in, 179
Acidosis of eclampsia, 211
  of pregnancy, high colonic irrigations for, 215
Acquisition, instinct of, 236
Acromegaly, 67, 107, 295
  symptoms of, 340, 341
Adams (Henry), 20, 21, 30
Addison's disease, symptoms of, 353
Adipositas dolorosa, 112
  universalis, 112
Adrenalin, 336, 352
  action of, on nervous system, 280
  functions of, 303
Adrenals, 60, 116
  action of, in fear, 304
  distribution of, 351
  function of, 303
  in pregnancy, 76
  relation to growth, 162, 165
Adrenin, 117
Advice, 45
Age of genital maturity, growth of skeleton and, relation of, 151
Aggression, placental, 77
Agoraphobia, 236
Albuminuria of pregnancy, 201
Alcohol, effects of, on endocrines, 311
Alcoholism, 145
Amenorrhea, 65, 118
  and pregnancy, 175, 188
  of lactation associated with lactation atrophy, 67
  of pregnancy, 135
  physiological, 135
Anaphylaxis, 280
Anger, emotion of, and instinct of pugnacity, 234
Angioneurotic edema, relation to menstruation, 159
Antagonism between emotions of sympathetic and cranial divisions of autonomic, autonomic system, 284
  and sacral divisions of autonomic system, 285
Antagonistic endocrine therapy for pituitary gland, 321
Asthenia, 75, 77
Atrophy, lactation, 134
  associated with amenorrhea of lactation, 67
  of uterus following curettage, 68
  ovarian, neuroses with, 270
Atropin, action of, on nervous system, 280
Autonomic nervous system, 280
  antagonism between emotions of divisions of, 284, 285
  Cannon's resumé, 281

Balance between endocrines, 287
  in individual endocrines, 287
  sense of, 9
Barker, 250
Bartels, 115
Basedow's disease, 104, 105, 222, 230, 240, 244, 245, 290, 325, 328, 344, 345, 346, 347
Benedict (Joan), 42
Berry, 104
Biedl, 95, 100, 101, 106, 123, 150, 151, 155
Blood-pressure, 113
  high, in pregnancy, 217
Blundel, 94
Breasts, development of, 132
Butler (Samuel), 45

Cachexia strumipriva, 101, 154
  thyreopriva, morbus basedowi and, differentiation, 350

Cæsarean section for eclampsia, 211, 213
Calcium metabolism, 76
and ovary, relation of, 62
Cannon, 117, 118, 281, 282, 283, 284, 285, 286
Cannon's resumé of autonomic nervous system, 281
Cardiac diseases, pregnancy in, 203
Cases, review of, 397-475
Castor oil for production of labor, 204
Castration, 76, 128, 151, 155
obesity from, 114
Catarrh, cervical, in sterility, 172
Cervical catarrh in sterility, 172
Change of life, 166, 168, 169, 338. See also *Climacterium, Menopause.*
Character, determiners of, 56, 57
Characteristics, sex, differences in, explanations for, 298
primary, 121
secondary, 121
Child, future of, 38
Children, curiosity of, 21
treatment of, 4
Chlorosis, 68
Chorea, 89
Chorioepithelioma, 209, 317
Chromosomes, 56, 57
sex, 57
Chronic benign hypothyroidism, 102
Church, 252
Chvostek, 98
Climacterium, 80, 161, 166, 168, 169. See also *Menopause, Change of life.*
dermatoses of, 160
glycosuria of, placental extract for, 322
Clinics, review of, 355-396
Coitus, excessive, phobias associated with, 305
Colonic irrigations, high, for acidosis of pregnancy, 215
Coma of pregnancy, feeding during, 216
Congenital myxedema, 101, 154
Constitutional dysmenorrhea, 65, 218. See also *Dysmenorrhea, constitutional.*
Construction, instinct of, 236
Contra-suggestion, 237
Convulsions. See *Eclampsia.*
Corpus luteum, 62, 64, 119, 123
action of trophoblast cells on, in pregnancy, 199
extract in vomiting of pregnancy, 201
function of, 197
in relation to fear, 273, 276
Courage, 304
Coyness, female, and sexual jealousy, 236
Cranial division of autonomic system, 282
Cretinism, 59, 101
Crime and delinquency, 255
Criminality, mental deficiency and, 257
Curettage, atrophy of uterus following, 68
in sterility, 171
dangers of, 184, 185
Curiosity, instinct of, and emotion of wonder, 234
of children, 21
Cushing, 91, 110, 111, 113, 114, 115, 116, 122, 244, 268, 269, 270, 329

Davenport, 252, 256
Degeneratio adiposogenitalis, 60, 68
Delafield, 243
Delinquency and crime, 255
Dementia præcox, 58, 90
Dercum, 58, 90
Dermatoses of climacterium, 160
Dermoid cysts, 317
Determination of sex, 57
Determiners of character, 56, 57
Development of breasts, 132
Dilatation and curettage in sterility, 171
dangers of, 184, 185
Discipline, 6, 29

Disgust, emotion of, and instinct of repulsion, 233
Dock, 105
Dominants, 57
Dreams, 148
  endocrine relation in, 305
Drugs and endocrine action in sleep, 311
Dysmenorrhea, 65
  constitutional, 218
    hysterectomy in, 224
    types, diagnosis of, 325
  placental secretion for, 205
Dyspituitarism, 116
Dystrophia adiposogenitalis, 108, 112, 321

Early habits, 14
  impressions, 6
    effects of, Henry Adams on, 20
Eclampsia, 97
  acidosis of, 211
  morphine in, 214
  Murphy drip in, 211
  of pregnancy, 207
    Cæsarean section for, 211, 213
    spinal puncture for, 208, 214, 216
    thyroid extract in, 213, 217
Elation, emotion of, and instinct of self-assertion, 234
Embedding and nesting, failure of, as cause of sterility, 178, 179
Emotion of anger and instinct of pugnacity, 234
  of disgust and instinct of repulsion, 233
  of elation and instinct of self-assertion, 234
  of fear, 79, 162, 163, 233
    and instinct of flight, 233
  of subjection and instinct of self-abasement, 235
  of tenderness and parental instinct, 235
  of wonder and instinct of curiosity, 234
Emotional antagonism between sympathetic and cranial divisions of autonomic system, 284
    and sacral divisions of autonomic system, 285
Emotions and instincts, 232
  endocrine balance in, 291
  instincts and endocrines, relation, 238
Encouragement, 40
Endocrine action and drugs in sleep, 311
  balance in emotions, 291
  structures, instability of, in woman, 147
  system, heredity and, 8
  therapy in abortion, 179
    in hyperthyroidism, 327
    in premenstrual symptoms, 221
    in sterility, 179, 180, 183, 190
    in the phobias, 277
    indications for, 140
Endocrines associated with fear, 273, 274, 275
  balance between, 287
  effect of alcohol on, 311
  higher up theory of sterility, relation to, 17
  immunity and relation, 316
  in gynecology, 135
  in sterility, 141
  individual, balance in, 287
  influence of influenza on, 12
  instincts and emotions, relation, 238
  relation of, to sleep and dreams, 305
  story of, introduction to, 56
  therapeutic suggestions concerning, 314
Endocrinology, 144
Endometrium, action of influenza on, 316
Energy and thyroid gland, 293
Environment, 4
Epilepsy and mental deficiency, 254
Epithelioma, chorionic, 209, 317

Eppinger and Hess, 280
Erdheim, 97
Eunuchoidia, 151
Eunuchs, 299
Exophthalmos, 336
Extract, ovarian, in amenorrhea of lactation, 68
in chlorosis, 68
therapeutic value of, 323, 326
pituitary, 63
for induction of labor, 204, 207
placental, 71
for dysmenorrhea, 205
for glycosuria of climacterium, 322
for menorrhagia, 206
thymus, 70
in metrorrhagia, 71
in persistent menorrhagia, 70
thyroid, in eclampsia of pregnancy, 213, 217
therapeutic value of, 327

Failure of embedding and nesting as cause of sterility, 178, 179
Fallopian tubes in sterility, 178
Falta, 341, 342, 343, 344, 345, 347, 348, 350, 352, 353
Fauser, 58
Fear, 7, 9, 13, 162, 163, 233
action of adrenals in, 304
corpus luteum in relation to, 273, 276
emotion of, and instinct of flight, 233
pituitary gland in relation to, 278
relation to physical state, 9
Fecundation, 56
Feeble-mindedness, grades of, 252
heredity in, 253, 254, 256
vs. insanity, 250
Female coyness and sexual jealousy, 236
Fibroids in sterility, 174
Fibromata of uterus, 317, 318
Fibromatous nodules in uterus in pregnancy, 302
Flight, instinct of, and emotion of fear, 233
Flushes, 168
Formative type of mental deficiency, 262
Frankel-Hochwart, 93, 97
Freud, 15
theory of, 15, 16, 143, 307
Frigidity, 145
Fröhlich, 109
Functional type of mental deficiency, 262
Functioning of ovary before menstruation, 289
Future of child, 38

General questions in history taking, 332
Genital maturity, age of, growth of skeleton and, relation, 151
Genitalia, development of, glands associated with, 163
Gland function, instability of, inherited, 85
Glandular therapy of sterility, 74
Gley, 90
Glycosuria, 105, 114, 117
of climacterium, placental extract for, 322
of pregnancy, 202
Goddard, 250, 253, 254, 255
Gonads, 62
Goodhart, 312
Goodman, 89
Gorst, 250
Grades of feeble-mindedness, 252
Granulosa lutein, 63
Graves' disease, 99, 103
Gregarious instinct, 236
Groos (Karl), 232
Gross and Tandler, 329
Growth and hypophysis gland, 294
anterior lobe of pituitary gland and, relation, 161
posterior lobe of pituitary gland and, relation, 161, 165
of body during pregnancy, 202